Independent Review of Competition and Innovation in Water Markets:

Final report

Professor Martin Cave
April 2009

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Foreword

Dear Chancellor, Secretary of State and Minister,

Twelve months ago, you asked me to undertake a review of competition and innovation in the water markets. The aim of the Review is to recommend changes to the legislation and regulation of the industry in England and Wales to deliver benefits to consumers, particularly the most vulnerable, and the environment through greater competition and innovation. This is my final report.

While the water industry has delivered much over the last 20 years - improving service levels and quality standards - the task of meeting ever higher customer expectations and tackling the new challenges facing the industry, particularly climate change and population growth, will require alternative approaches and new ways of working.

In this report I recommend changes to both the regulatory and legislative frameworks of the water sector to encourage the industry to become more innovative, whether through competition or co-operation, so that it is better able to anticipate, manage and respond to these challenges. In doing so, I have adopted an integrated approach. Rather than focus on particular mechanisms, I have looked at the costs and benefits of greater use of competition, the adoption of market-like instruments and the reform of monopoly regulation. I have recommended those reforms that I believe will best deliver for customers and the environment. They could also reduce the regulatory burden on the industry.

Given the lack of international experience of some of the changes proposed, their cumulative nature and the need for the necessary contributory factors to be in place, I believe it is right to take a step-by-step approach to reform, starting where the risk-reward ratio is most favourable. The UK and Welsh Assembly Governments and the UK Parliament and the National Assembly for Wales can then review the costs and benefits of further change on the basis of experience to date. While doing so, it will be important to maintain an open dialogue with the industry, investors and other stakeholders to maintain their confidence.

In undertaking the Review, I have also been mindful of the range of circumstances prevalent across England and Wales, including the different nature of water and wastewater markets and the variety of company structures. I have therefore avoided a 'one-size-fits-all' approach. The UK Government and Parliament and the Welsh Assembly Government and the National Assembly for Wales will therefore want to adopt the recommendations in this report in a flexible manner, seeking to retain the benefits of the current framework as appropriate, while taking forward reforms where they will bring further benefits to both customers and the environment.

I believe that the current abstraction licence and discharge consent regimes fail to ensure that resources are used efficiently and sustainably. I recommend that the Environment Agency should be given new powers to tackle over-abstraction and to encourage the trading of licences. Licence conditions should also be reformed to take greater account of the impacts of abstractions and discharges on the environment.

In resources, treatment and infrastructure, I see benefits from the introduction of greater competitive pressure. Initially, incumbents should be given an economic purchasing obligation and the water supply licensing regime should be reformed. At a later stage a contracting entity for new capacity may prove to be more effective. For those elements of the value chain that will remain monopolistic, Ofwat should encourage greater innovation by increasing the incentives for outperformance and addressing the potential bias to capital expenditure. The UK and Welsh

Assembly Governments and regulators should also ensure that they give the industry timely and consistent signals about the outcomes required.

In light of further representations, I recognise there may be benefits in removing the non-household threshold for retail competition on the introduction of appropriate accompanying changes and legal separation. This will allow all non-household customers to choose supplier. I also propose that customers and their representatives take a greater role in determining the services provided by companies.

The special merger regime represents a significant barrier to further consolidation, adversely affecting the scope for efficiency gains, financing costs and resource optimisation. I propose that the regime is reformed and restricted to those mergers which are likely to have a significant impact on Ofwat's ability to undertake comparative competition. Stakeholders should also be given greater certainty about the process.

To bolster the innovative capacity of the industry, I propose the creation of a research and development body to agree a shared research and development vision for the industry and to co-ordinate the work of stakeholders. This organisation would be supported by funding, including revenue from customers and water companies' shareholders.

Together, a purchasing obligation, a reformed Water Supply Licensing regime, a modernised inset process and further retail competition could have a discounted net present value of £2.5 billion over 30 years. There would also be significant non-monetised benefits including improved environmental outcomes and higher service and quality levels.

I am grateful for the level of engagement I have received from stakeholders and regulators both inside and outside the water sector. Their contributions to stakeholder events, discussions and our documentation have been invaluable. I would also like to recognise the support of officials at the Review's two sponsoring departments, the Department of Environment, Food and Rural Affairs and HM Treasury: Martin Hurst, Richard Wood, Joly Macleod, Robert Canning and David Jones, (Defra), and Peter Schofield, Lewis Neal, Jessica Davies, Erin O'Shannessey, Carl Pheasey and Anna Soo (HMT).

Finally, I would like to thank the Review team for their work and support over the last year: Paul Heigl, Tony Hilton, Andrew Morris, Alex Skinner (team leader), Sean Smith, Alex Whitmarsh and Janet Wright.

Professor Martin Cave

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22 April 2009

Executive summary

Background

Twelve months ago, the Chancellor of the Exchequer, the Secretary of State for the Environment, Food and Rural Affairs and the Welsh Minister for the Environment, Sustainability and Housing commissioned an independent review of competition and innovation in the water markets in England and Wales. This is the Review's final report.

The aim of the Review is to recommend changes to the frameworks of the industry to deliver benefits to customers and the environment. The Review did not consider competition or innovation as being ends in themselves but a means of improving services for customers, particularly the most vulnerable, and improving environmental outcomes.

In the 20 years since privatisation, the industry has attracted nearly £80 billion in investment, generally at favourable terms, to enhance the network and improve water and environmental quality. As a result, drinking water is safer than ever before and more rivers and beaches are meeting the required European Union standards. However, this has come at a cost to consumers. Since 1989, household charges have risen in real terms by 42 per cent. There are also continuing challenges, such as the on-going backlog of infrastructure maintenance and rising customer expectations that need to be addressed.

In addition, the industry faces a series of new challenges, particularly population growth and climate change. The Environment Agency projections for England and Wales indicate that net overall river flows could fall by up to 15 per cent by 2050 with winters becoming wetter and summers drier, particularly in south-east England where 15 per cent of water resource zones are already classified as seriously water stressed. Precipitation in Wales could increase by seven to 24 per cent in winter and decrease by seven to 14 per cent in summer putting a strain on aquatic ecosystems.[1] Climate change will also affect the recharge of aquifers reducing groundwater levels. The Office for National Statistics reports that the population of England is projected to increase by 15 per cent to 62 million by 2030. The largest increases are likely to be in the south-east and south of England where resource zones are classified as already water stressed. Over the same period, the population of Wales could rise by 9.7 per cent to 3.3 million, with the greatest population increase occurring in south Wales.[2]

Together, increased demand and lower supply will place a premium on the industry to find new and more efficient ways of allocating, treating and using water - not only to ensure sufficient supply, but also to protect the environment through the use of fewer inputs such as energy and chemicals and reduced need for new assets. This could be between, as well as within, companies. These changes will also have implication for the reliable collection and treatment of wastewater and the need for lower impact discharge back to the environment.

The present time is therefore an opportune moment to review the structure of the water sector and its legal and regulatory frameworks. Introduced in the right way, competition and co-operation between companies, driven by market mechanisms, market-like instruments or regulation can encourage innovation and the delivery of lower prices, a better service and improved environmental outcomes.

1 National Assembly for Wales: The impacts of climate change in Wales from now to 2080, 2000

2 Government Actuary Department, Components of change and summary indicators, viewed on March 10 2009,
<http://www.gad.gov.uk/Demography_Data/Population/Index.asp?y=2006&v=Principal&dataCountry=england&chkDataTable=yy_cc&subTable=Perform+search>

Competition

The industry is currently dominated by 21 vertically integrated monopolies. There is choice for some customers, primarily through the inset regime introduced in 1990, but because of restrictive conditions, there have only been 18 such appointments to date. The Water Supply Licensing regime introduced in 2005 established a common carriage model of competition, but it was flawed in conception and implementation. As a result, only one customer has recently been able to switch to a new supplier. There is also variable use of bulk-supplies, self-supply and pre-treatment capacity. A special merger regime, which requires all mergers to be referred to the Competition Commission, discourages further consolidation.

Consequently, efficiency in the industry is almost totally driven by economic regulation by Ofwat. Improved performance is encouraged through rewards for outperformance relative to cost, and service quality improvements are promoted through the overall performance assessment. However, the rewards for outperformance are relatively modest and the risks from failure are high. As regards the overall performance assessment, the value of the rewards available are small and largely unrelated to the value of the benefits delivered to customers.

The Environment Agency and the Drinking Water Inspectorate enforce environmental and quality standards. These are primarily determined at a European Union level.

Innovation

Any analysis of the sector's record on innovation is hampered by a lack of data. However, some evidence can be gained from proxy measures such as spending on research and development, patent activity and levels of productivity growth. The UK Government's Council for Science and Technology review of the water sector notes:

> *The water industry's performance in terms of investment in technology and application of innovative solutions is highly variable between companies in both clean water delivery and in wastewater and sewerage treatment…[and] investment in research and development is low for the sector generally.* [3]

Furthermore, they argue that:

> *There is a risk that continued low levels of R&D intensity will lead to limited scope for productivity gains in the future once today's practices and technological developments are incorporated by water companies. It could also mean that water technologies developed elsewhere will not be adopted in the UK due to higher costs of appropriation as a result of under-investment in the water sector's R&D base.* [4]

Research commissioned by the Review supports these conclusions. While many companies see research and development as an important driver of their business, support for such activity, is very variable and ranges from 0.02 per cent to 0.66 per cent of turnover. A minority of companies characterise themselves as followers, relying on others to test and implement new technologies. Comparisons of international data suggests that the UK is responsible for fewer innovations per capita than other countries such as Australia, Germany, the Netherlands, Spain and the United States. The UK does however appear to attract patenting activity from abroad, suggesting that there is scope for the adoption of innovations. Economic research also presents a mixed picture on rates of productivity growth in the sector. Some research finds evidence of

3 Council for Science and Technology Innovation in the water industry: A Review by the Council for Science and Technology, 2009, viewed on 26 March 2009, <http://www2.cst.gov.uk/cst/reports/files/water.pdf>

4 Ibid

productivity growth since privatisation while other research finds that such growth has been limited and almost entirely confined to the period following the 1999 price review.[5]

The Review has also observed:

- much innovation has been top-down, driven by new water and environmental quality standards. This has often taken the form of large scale capital expenditure solutions based on incremental improvements to existing ways of working;
- innovation has also been driven by the system of economic incentives. Companies have used innovative financial structures to reduce the cost of debt and have substituted capital for labour to reduce operating expenditure;
- in recent years, firms' research and development capacity appears to have declined. In a time of change, companies must be able to stimulate levels of innovation in the sector both directly and through working with others; and
- there is general agreement on the potential benefits of greater levels of innovation for customers and the environment and a recognition that such innovation should be supported through market mechanisms and regulation as appropriate.

Overall approach

In assessing the scope for, and benefits of, reform, the Review recognises that over the long-term, on-going customer gains and environmental improvements are driven primarily by innovation. This could be the result of competition in the market or for the market, market-like instruments or regulation encouraging companies to compete, either individually or in partnership, for business.

So, the introduction of market forces could drive companies to share water resources, limiting the need for new assets, keeping bills down and reducing any impacts on the environment. Alternatively, better regulation could lead to the development of new pipe maintenance technology, reducing the need to excavate roads, lowering the cost of repairs and reducing the need for abstraction.

For any given state of innovation, there may also be direct benefits to customers and the environment from the better use and allocation of resources, but there will be limits to the scale and scope of such benefits. Innovation can therefore be considered as the long-term driver of improved outcomes, and competition and regulation are both drivers of improved outcomes in the short-term and innovation in the long-term. The Review has therefore adopted an integrated approach to the final report, based on these drivers, their impact on innovation and ultimately the consumer benefits and environmental improvements they deliver. Such an approach could also reduce the regulatory burden on the industry.

The advantages of such an approach are exemplified in the analysis of the supply of raw water. Climate change and population growth will have differential impacts across the country. Some areas will suffer increasing shortages while others will continue to be in surplus. At present, however, the legal and regulatory frameworks of the industry encourage companies to be self-sufficient in water, abstraction charges are very similar across the country, the special merger regime limits consolidation and policy guidance, like the UK Government's strategy for England

5 Independent Review of Competition and Innovation in Water Markets: Interim report, 2008, viewed on 10 March 2009, <http://www.defra.gov.uk/environment/water/industry/cavereview/pdf/cavereview-report.pdf> paragraph 9.10 onwards

Future Water or the Welsh Assembly Government's *Strategic Policy Position Statement on Water*, has not yet taken hold.[6] Under such circumstances, outcomes will be sub-optimal.

An efficient response to this would involve tariff reform, demand-side measures, better leakage control, the greater trading of water between surplus and deficit areas, the optimisation of new resources and the entry of new companies. This requires market and regulatory frameworks that encourage both head-to-head competition – where companies seek to replace each other to gain market share - and collaborative competition – where groups of companies work together to attract new customers.

In the following sections, the Review sets out the changes to the market and regulatory frameworks of the industry which will best encourage companies to compete and co-operate to maximise benefits to consumers and the environment. Given the very different circumstances prevalent across England and Wales, the Review does not recommend a one-size-fits-all approach. Some recommendations will be more applicable in some areas than others and should be taken forward accordingly.

Given the lack of international experience of some of the changes proposed, their cumulative nature and the need for the necessary contributory factors to be in place, I have adopted a step-by-step approach to reform, starting where the risk-reward ratio is most favourable. The UK and Welsh Assembly Governments and the UK Parliament and the National Assembly for Wales can then review the costs and benefits of further change on the basis of advice from Ofwat and experience to date.

The net present value of the changes below, including an economic purchasing obligation, a reformed Water Supply Licensing regime, a modernised inset process and retail competition, could be £2.5 billion. There would also be significant non-monetised benefits including improved environmental outcomes and higher service and quality levels.

Table 1.A: Discounted net present value of Review recommendations over 30 years (£ million)

Recommendation	Value (£ million)
Purchasing obligation	1,300
Reform to Water Supply Licensing regime	400
Inset modernisation	300
Retail competition	600

Source: Review calculations

Abstraction

At present, abstraction licences are issued on a first-come, first-served basis. Charges are limited to cost recovery and are relatively crude. Many historic licences are in perpetuity, although more recently licences have been issued on a time limited basis. While such a framework supplies water at low administrative cost, it fails to ensure that water goes to those who value it most (including the environment) or that it is used efficiently.

The Review therefore recommends that, where licence levels are sustainable, licences should be fully tradable subject only to modification for direct environmental impacts and the impact on

6 Welsh Assembly Government; Strategic Policy Position Statement on Water, 2009, viewed on 10 March 2009, <http://wales.gov.uk/consultations/closedconsultations/environment/waterstatement/?lang=en> and Department of Environment, Food and Rural Affairs, Future Water, 2008, viewed on 10 March 2009, <http://www.defra.gov.uk/environment/water/strategy/pdf/future-water.pdf>

other users from a change of use or location. The Review welcomes the work by Ofwat and the Environment Agency on reducing the barriers to trading and supports the provision of more information, improving the administrative process and giving traders more confidence about the rights licences confer.

In order to free up the abstraction licence market for trading, and to protect the environment in those catchments where licensed volume levels are unsustainable prompt action should be taken. Legislation should empower the Environment Agency to facilitate the return of licences through reverse auctions and negotiated agreements. In those circumstances where there are still unsustainable licensed volume levels, a scarcity charge should be introduced to restore sustainable licensed volume levels. In the first instance, the price would be uniform across over-abstracted catchments and gradually increased over time to encourage holders to trade or retire licences and realise the true value of water. Legislation should allow revenues from abstraction charges to rise above that required for cost recovery. Legislation should be altered such that revenues from abstraction charges are not capped at cost recovery. Revenues raised from the charge could be used to support environmental enhancements, vulnerable consumers or returned to individuals more widely. However it would be for Government to consider how to make use of any revenue raised.

Such an approach would support the efficient and sustainable abstraction of water across England and Wales by encouraging incumbents and others to exploit differences in availability and price of water and alternative measures (such as leakage control and demand management) to meet supply at lowest economic and environmental cost. This would include not only the optimisation of water resources within company boundaries, but also between companies through the transfer of raw and treated water.

In the longer term, the time limiting of abstraction licences could help deliver environmental benefits. The UK and Welsh Government will need to consider the duration of these licences and how licences will be reissued in order to deliver quicker wins for the environment whilst minimising regulatory uncertainty which could affect incentives to make investments with long payback periods.

Discharge

At the present time, discharge consents are issued on a first-come, first-served basis and charges are limited to cost recovery. Discharge consent conditions are also based on output concentrations rather than actual conditions in the receiving water. While such a framework allows the discharge of appropriate levels of pollutants at low administrative cost, it does not ensure that wastewater is treated or released efficiently.

The Review recommends that consent holders should be able to trade their discharge consents by pollutant subject only to modification for direct environmental impacts from a change of location. In addition, a pilot should be run to investigate the potential for trading between point sources and diffuse emissions. Where a scarcity charge for abstractions applies, the loss factor adjustment in abstraction licences should be supplemented by discharge payments according to the volume, quality and location of water returned, where such information exists. Discharge consent conditions could also better reflect the impact of discharge on the environment, for example, through real-time control. The Review would encourage further research, including pilots, to establish the costs and benefits of consent conditions based on real-time flow volumes and quality conditions in the receiving body.

Together, these measures would encourage the more efficient and sustainable discharge of wastewater delivering benefits to both customers and the environment through reducing the cost of meeting consents, encouraging the discharge of water where it was of most value and

reducing the need for inputs such as chemicals and energy in existing treatment works and decreasing pressure for new capacity.

Upstream

At the present time, the provision of water and wastewater treatment, sludge treatment and disposal and infrastructure is dominated by the local, vertically integrated, monopoly incumbent. The scope for innovation is therefore primarily determined by Ofwat's system of economic regulation. This allows companies to retain any outperformance as a result of efficiency innovations for between five and seven and half years. Ofwat, in consultation with Drinking Water Inspectorate and the Environment Agency, also determines the funding needed to meet the quality standards the industry must meet. These standards are primarily determined at a European Union level. While such an approach ensures that customers receive a significant share of any efficiency savings and do not pay for failure, it is also likely to deter companies from investing in less certain, but potentially more valuable innovations.

The Review therefore supports the introduction of greater upstream competition as a way of stimulating innovation. However, mindful of the critical impact of financing on investment and customer bills and the lack of experience of such competition, the Review supports a step-by-step approach, starting where the risk-return ratio is most favourable. As an initial step, the Water Supply Licensing regime should be reformed to ensure that it works effectively and is supplemented with a framework of economic purchasing. This would require:

- an obligation for incumbents to procure the best value combination of water, wastewater and infrastructure supplies as part of the regulatory process. Companies' decisions would be scrutinised by a procurement panel with independent members and would be subject to review by Ofwat in making its periodic review determination and the Environment Agency in determining the management of water resources;
- unbundling the current combined supply licence and creating a new upstream licence for companies wishing to introduce raw or treated water into an incumbent's network or remove and treat wastewater or treat and dispose of sludge from it. There should also be a network licence for those looking to provide infrastructure. The current structure of licences for incumbents would remain as now;
- mandating the publication of water and wastewater supply costs at a water resource zone level and transport costs across incumbents' regions based on a common methodology;
- for water resource supplies from an alternative provider to existing incumbents, replacing the costs principle, which determines the discount suppliers obtain from the incumbent for using their own resources, with an ex-ante access pricing framework based on the full economic costs. Access prices would be determined by Ofwat at a water resource zone level on a common methodology with reference to guidance from Defra and Welsh ministers. Such an approach 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.

- for supplies to retailers or large customers, replacing the costs principle with an ex-ante access pricing framework based on long-run avoidable costs. Access prices would be determined by Ofwat at a water resource zone level on a common methodology, with reference to guidance from Defra and Welsh ministers. Such an approach should ensure that:
    - an efficient network operator is able to cover their costs;
    - tariffs are non-discriminatory; and
    - efficient sources of supply are supported.
- introducing common operational codes and systems, binding on all market participants;
- creating powers for Ofwat to undertake proactive investigations of non-compliance; and
- ensuring that the Drinking Water Inspectorate has appropriate powers and resources to maintain the quality of, and confidence in, the wholesomeness of the water supply.

The estimated net present value of such a change over 30 years could be of the order of £1.2 to £2.2 billion. This is set against total costs under business as usual of over £160 billion. In addition to this, there should be other non-monetised benefits including improved environmental outcomes, greater choice and higher service levels.

The decision as to when and how to extend competition beyond these developments should be taken by UK Government and Parliament in England and the Welsh Assembly Government and National Assembly for Wales. The UK and Welsh Assembly Governments would propose any legislative changes on the advice of Ofwat and other stakeholders, on the basis of experience with economic purchasing, lessons learned from other countries and assessments by Ofwat. It is important that any legislation is sufficiently flexible to allow the industry to adopt different models across the country and over time.

At a later stage, it appears that an independent entity that contracted for delivery of water and wastewater services at best value could deliver greater benefits to customers and the environment. The estimated net present value of such a change over 30 years could be of the order of £2.5 to £5.3 billion, with greater costs and benefits. While there is scope for introducing in the market competition in parts of the country and for certain elements of the value chain, at the current time the cost-benefit ratio is more uncertain. It appears that the potentially substantial increase in the cost of capital from such a market structure could more than outweigh any increases in efficiency. Actual costs will depend critically on how such competition is introduced.

In the short to medium-term, regulation will continue to be important in driving efficiency and innovation in water and wastewater treatment and it will have an on-going role in the development of the network. The Review therefore supports Ofwat's decision to introduce a new framework for capital expenditure as part of the 2009 periodic review. The capital expenditure incentive scheme rewards or penalises companies symmetrically in proportion to their out or underperformance compared to an efficient baseline, thereby providing much greater incentives for innovation. Such an approach should be taken further. Companies should be given a greater efficiency incentive for significant and sustained outperformance on an historical basis. To introduce the same symmetry and incentives, such an approach should also be applied to operating expenditure.

The system of economic regulation, through a margin between the allowed return and the weighted average cost of capital, may also encourage companies to adopt capital expenditure solutions when considering the need for new or replacement capacity and to seek operating expenditure savings for any given level of capacity. This could deliver sub-optimal solutions. Ofwat should address this bias by adopting a capital-operating expenditure ratio assumption for individual companies as part of the periodic review settlement. Once a settlement had been agreed, companies would be remunerated in proportion to this assumption and their level of spending. They would still have an incentive to outperform, but would be indifferent between whether this was through a capital or operating expenditure solution. Ofwat should take forward these recommendations as part of their review of regulation, ahead of the process for setting prices from 2015.

It is also important that the UK and Welsh Assembly Governments, quality and economic regulators and other stakeholders agree on the priorities for the industry, in particular where these may have non-monetised benefits, so that companies have confidence to invest in new ways of working. The Review therefore recommends that wherever possible, these organisations should agree clear objectives, including legislation and guidance, and communicate them clearly and in a timely fashion, to give stakeholders the certainty they need to innovate and the time necessary to do so.

Such an approach, reforming both the regulatory and market frameworks of the industry, would encourage greater innovation and the better use of existing resources and reduce the cost of new or replacement assets at low cost. This would benefit customers through lower prices and the environment through the development and adoption of alternative technologies and the more efficient use of existing assets.

Retail

At the present time, only those non-household customers likely to use at least 50 megalitres a year are able to choose their retailer and such retailers are unable to offer attractive terms. As a result, the vast majority of networked customers are supplied by their local incumbent with prices and quality standards determined by Ofwat as described above. While this ensures delivery of minimum service standards at a determined price, customers are unable to choose the combination of service and choice that they would like. Little weight is given to service or quality standards.

In the interim report, the Review recommended that the non-household threshold should be reduced to five megalitres a year as soon as is practicable. On the introduction of accompanying changes to the retail framework, including replacement of the costs principle, the introduction of national codes and legal separation, the threshold should then be reduced to at least one megalitre a year. The UK Government accepted the recommendations to reduce the threshold to five megalitres and reform the access price. It is strongly minded to support legal separation. The Welsh Assembly Government asked for further analysis given the particular circumstances in Wales before reaching a decision.

On the basis of responses to the interim report and further analysis, the Review now believes that after an initial five megalitre threshold, there may be practical benefits from abolishing the retail threshold for non-household customers on the introduction of accompanying changes. There may also be a case for a de-minimis threshold for legal separation. At this time, the case for extending competition to households remains weak. Ofwat, with support from stakeholders, should provide further assessments of the costs and benefits of these changes at the appropriate time as part of its duty to report to the UK and Welsh Assembly Governments on the development of water markets.

These changes should be accompanied by negotiated settlements between the Consumer Council for Water, retailers, wholesalers and other stakeholders to determine quality and service standards for wholesale supply. Elements of such an approach have already been adopted in England and Wales. For example, as part of the current price review the Consumer Council for Water has negotiated with each water company and their quality regulators locally. The Consumer Council for Water has also encouraged companies to develop plans that are grounded in consumers' views and that they will accept.

Initially, these settlements should have a weight in price limits of plus or minus three per cent of turnover. It will be for retailers together with other stakeholders to negotiate the size of the settlement, whether it is symmetrical, and what service and quality improvements the local incumbent should deliver. Retailers would remain free to agree further more demanding conditions. A similar approach should be adopted between the Consumer Council for Water, monopoly household retailers and other stakeholders for household supply. As the economic regulator, Ofwat would remain responsible for agreeing and incorporating the results of such negotiations in price limits.

Together these measures will allow many non-household customers to choose the combination of service and price that they prefer. Retailers will also be able to better represent their customers' interests with wholesalers. Although household customers will not be able to choose their supplier, they will benefit from any spillovers from non-household competition and will be have a greater say over the services they receive.

Industry structure

Currently, the special merger regime means that any water company with an individual turnover of more than £10 million is unable to merge with another without being referred to the Competition Commission because of the potential impact on Ofwat's ability to undertake comparative competition. While such a regime supports Ofwat's current approach to comparative competition, it also reduces management incentives, limits the scope for the transfer of best practice between companies and increases financing costs. In the case of neighbouring companies, there are also likely to be benefits from the better optimisation of assets, including water resources. The use of other approaches for assessing company performance, the introduction of accounting separation and development of retail competition, should also reduce the need for any given number of comparator companies

The Review therefore recommends that the threshold for the special merger regime should be raised to £70 million and applied to the smaller of the merging companies, as with the wider merger regime. For mergers above this threshold, the Office of Fair Trading should be given power to undertake a stage one assessment of potential mergers. To support such an approach, Ofwat should publish a methodology for assessing the loss of a comparator. This should be transparent, based on clear criteria and replicable. To assess the scope for offsetting the loss of a comparator, Ofwat should also commission an independent review of the value of alternative data sources and statistical techniques. This should inform the methodology above. Consolidation should result in increased efficiency, higher service levels, greater levels of research and development and the better use of resources.

The current framework also supports a system for inset appointments. These offer certain users the ability to substitute an alternative supplier to the local incumbent. While these have the potential to offer customers choice, lower prices, better service and reduced environmental impact, the current framework does not guarantee these outcomes because there are significant barriers to entry, costs may not distributed appropriately and there may be inefficient entry.

In the long-term, the Review believes that customers and the environment would be best served by incorporating the current system of inset appointments into a reformed upstream framework. This would address the issues above and enable inset appointees to provide upstream, infrastructure and retail services to a much wider market on an equal footing with incumbents and other providers. In the interim, the Review recommends measures that will remove barriers to entry and support efficient competition.

Together, these measures will enable entry where it benefits customers and the environment.

Innovative capacity

The current framework of economic regulation does not always encourage significant investment in research and development or the trialling or adoption of innovations. This is because, depending on the level of investment, the probability of a successful outcome and value of the saving, the current outperformance period of between five and seven and a half years may be insufficient. Moreover, any increase in operating expenditure may be viewed as an apparent increase in inefficiency.

While such a system ensures that companies consider the short-term value-for-money of spending, in the long-term it may also lead to a decline in research and development and in companies' ability to drive innovation, which will be important in meeting the new challenges of climate change and population growth. The short-term protection of customers may therefore come at the expense of long-term industry performance.

The Review therefore recommends that the UK and Welsh Assembly Governments, industry, regulators, suppliers, research councils, Technology Strategy Board and others come together to agree a shared research and development vision for the industry and coordinate their work. While priorities should be agreed by these stakeholders, the Review has identified a number of areas which could be supported, including developing the evidence base around, and technology for, real time abstraction and discharge licensing. UK Water Industry Research has suggested that the industry could support research and development in underground asset maintenance, leakage, energy use, smart meters and water and wastewater treatment technologies.

To support this vision, I propose the creation of an industry research and development body. The body would be supported by funding, which could be to the order of £20 million a year, which would be allocated on a competitive basis to organisations undertaking basic research, development and trialling as appropriate. The fund would be open to all organisations and water companies would be able to recover up to half their subscription from customers (equivalent to around 50 pence a year). Any profits from patents or licenses would be returned to members and, in the case of water companies, to customers and shareholders on a proportionate basis. In the first instance, the fund should be established for 10 years. This and other expenditure on research and development should be excluded from Ofwat's efficiency comparison tables.

To enable Ofwat to better support innovation in the industry by, for example, taking forward the research and development board and other recommendations in this report, I propose that the Ofwat be given a statutory duty to promote innovation. Ofwat should also have a duty to report to the UK and Welsh Assembly Governments every five years on the measures it has taken to support innovation and how effective these measures have been, including the research and development fund.

Such an approach would increase companies' capacity and competence to undertake and lead research and development and increase innovation levels in the industry.

1 Introduction

1.1 Twelve months ago, the Chancellor of the Exchequer, the Secretary of State for the Environment, Food and Rural Affairs and the Welsh Minister for the Environment, Sustainability and Housing commissioned Professor Martin Cave to undertake an independent review of competition and innovation in the water markets in England and Wales. This is the Review's final report.

1.2 The aim of the Review is to recommend changes to the frameworks of the industry to deliver benefits to customers and the environment. The Review did not consider competition or innovation as ends in themselves but a means of improving services for customers, particularly the most vulnerable, and of protecting the environment.

1.3 While the industry has achieved a great deal over the last 20 years, on-going challenges such as value for money and quality standards remain. In addition, the sector faces new challenges, most notably climate change and population growth. Now is therefore the right time to review the structure of the sector and its regulatory and legal framework. Competition between companies, driven by market forces, market-like instruments or regulation are essential to encouraging innovation and to the delivery of lower prices, better service and lower environmental impacts.

1.4 The interim report made a number of recommendations to the UK and Welsh Assembly Governments on the introduction of retail competition and contained emerging findings on the abstraction and discharge regimes and the upstream (water and wastewater treatment, sludge treatment and disposal and infrastructure) part of the value chain. Further information on these issues can be found in that document.[1] The recommendations in this document focus on the upstream elements of the value chain, the structure of the industry and its innovative capacity.

1.5 Chapter two sets out the key challenges and opportunities facing the industry and describes the potential scale of these issues over the next 30 years.

1.6 Chapters three to five describe the case for reform of the abstraction and discharge regimes, upstream (water and wastewater treatment, sludge treatment and disposal and infrastructure) and retail elements of the value chain. They then go on to assess options for reform and their costs and benefits. Finally they propose specific recommendations for the UK and Welsh Assembly Governments, the industry and the regulators.

1.7 Chapter six assess the need and scope for broader reform of the industry. In particular, it discusses whether and how the special merger and inset appointment regimes should be reformed. Chapter seven focuses on measures to strengthen the innovative capacity of the industry. Chapter eight summarises the report's recommendations.

1 Independent Review of Competition and Innovation in Water Markets, 2008, viewed on 10 March 2009, <http://www.defra.gov.uk/environment/water/industry/cavereview/pdf/cavereview-report.pdf>

2 Challenges and opportunities

Introduction

2.1 On privatisation in 1989, the water industry faced a number of key challenges: addressing years of under-investment, meeting higher European Union drinking water and environmental quality standards, and doing so efficiently by securing competitive and sustainable financing and driving down costs. Over the last 20 years, the industry has risen to these challenges investing around £80 billion, often borrowed at favourable rates. This investment has delivered higher quality drinking water, with an average of 99.96 per cent compliance with European Union standards. It has also resulted in improvements to aquatic ecological quality and near universal compliance with minimum European Union standards for Britain's beaches. However, a number of these, primarily customer expectations, environmental standards and efficiency, remain on-going challenges. New challenges, most notably climate change and population growth are also impacting on the sector and creating new opportunities for the delivery of water and wastewater services.

Climate change

2.2 The most up to date UK climate projections from the United Kingdom Climate Impacts Programme have now been delayed until spring 2009. The analysis in this report is therefore based on 2002 climate change projections and will be subject to change.[1] The projections for England and Wales suggest that overall river flows could fall by up to 15 per cent by 2050 with winters becoming wetter and summers drier, particularly in south-east England where 15 per cent of water resource zones are already classified as seriously water stressed.[2] Precipitation in Wales could increase by 7 to 24 per cent in winter and decrease by 7 to 14 per cent in summer.[3] However with improving technologies and an expanding green industry sector there are opportunities to partially mitigate supply variability with better targeted resource management and process optimisation.

2.3 At the same time, the need to meet more stringent environmental standards and expectations will put upward pressure on the use of energy and chemicals. For example, on the basis of current technology, meeting the quality standards of the water framework directive, such as advanced drinking water treatment of sewage effluent, could result in energy use and greenhouse gas emissions quadrupling by 2030 and chemical use for treatment increased by 50 per cent.[4]

1 UK Climate Impacts Programme , 2002, viewed on 10 March 2009, <http://www.ukcip.org.uk/index.php?id=161&option=com_content&task=view>

2 Environment Agency: Water Resources – current state and future pressures, 2008, viewed on 10 March 2009, <http://www.environment-agency.gov.uk/research/library/publications/100582.aspx>

3 Welsh Assembly Government: Strategic Policy Position Statement on Water, 2009, viewed on 10 March 2009, <http://wales.gov.uk/consultations/closedconsultations/environment/waterstatement/?lang=en>

4 UK Water Industry Research: A review of treatment technologies and their impact on climate change, 2002

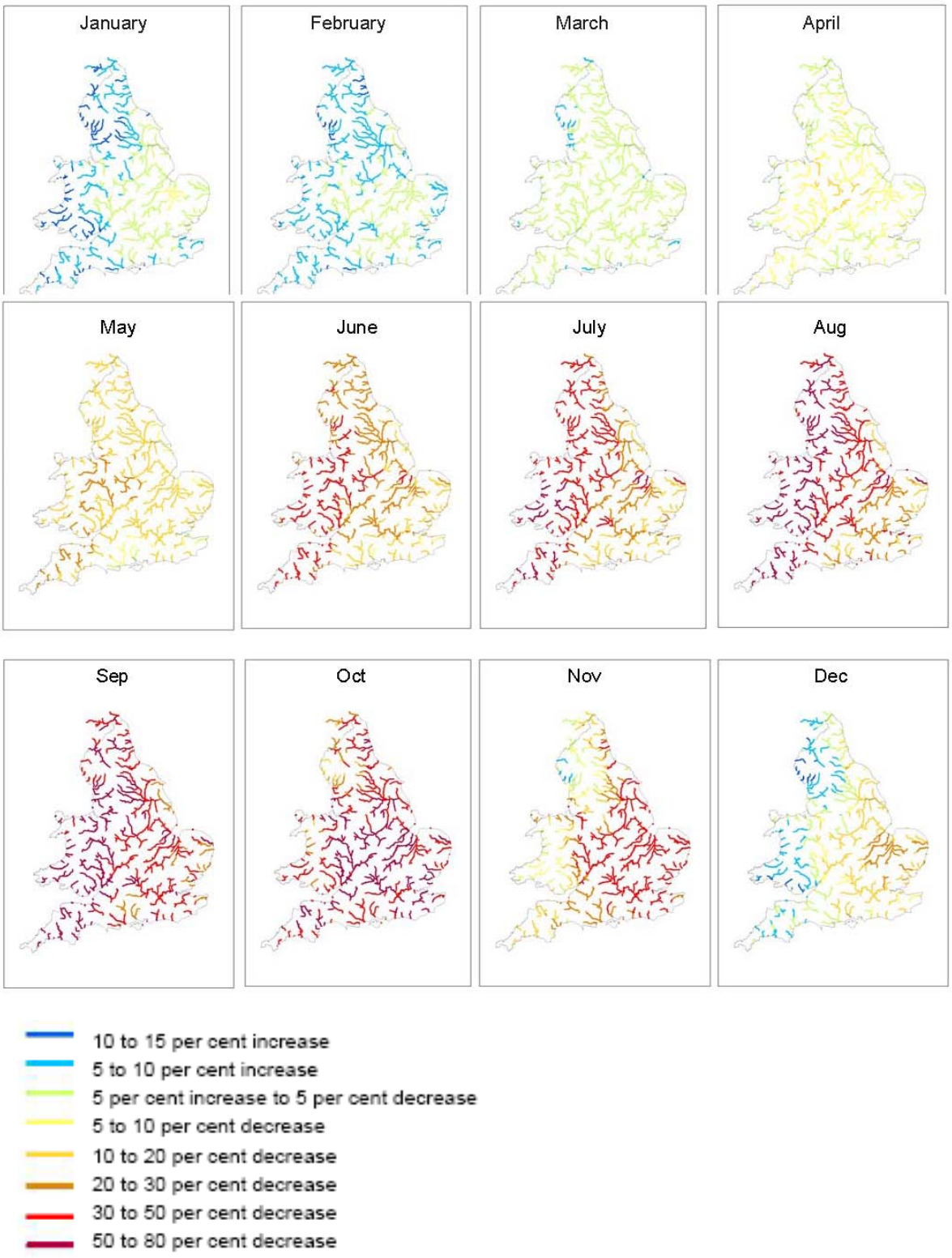


Figure 2.A: Percentage change in river flows between now and 2050[5]

5 UK Climate Impacts Programme , 2002, viewed on 10 March 2009, <http://www.ukcip.org.uk/index.php?id=161&option=com_content&task=view>

Population growth

2.4 The population of England is projected to increase by 15 per cent to 62 million by 2030.[6] The largest increases are likely in the south east and south of England where many Catchment Management Abstraction Strategy units are already classified as water stressed. Over the same period the population of Wales could increase by 9.7 per cent to 3.3 million. The number of households in England and Wales has increased 30 per cent since 1970 and, based on current trends, there could be an extra 220,000 households every year up to 2026 of which 72 per cent will be single occupancy households.[7] Single occupancy households in England could reach 4.5m over the next 20 years, an increase of 3.9 per cent since 1991.[8] Typically single occupancy household have water consumption rates per person approximately 40 per cent higher than the average dual occupancy household. This will exaggerate the effect of population growth on demand.

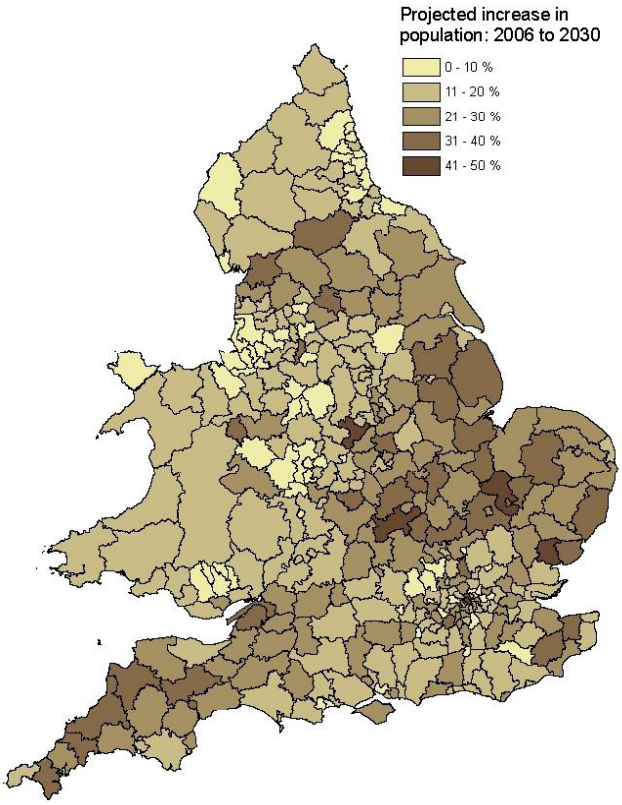


Figure 2.B: Projected increase in population in England and Wales 2006 to 2030

Water consumption

2.5 Currently, per capita consumption in England is estimated at 148 litres per person per day and around 149 litres in Wales.[9] The UK Government has set out a vision for per capita

6 Government Actuary Department: Components of change and summary indicators, 2009, viewed on 10 March 2009, <http://www.gad.gov.uk/Demography_Data/Population/Index.asp?y=2006&v=Principal&dataCountry=england&chkDataTable=yy_cc&subTable=Perform+search>

7 Communities and Local Government & Department of Environment, Food and Rural Affairs,:Water efficiency in new buildings, 2007, viewed on 10 March 2009, - <http://www.communities.gov.uk/documents/planningandbuilding/pdf/WaterEfficiencyNewBuildings.pdf>

8 Office of National Statistics, 2007, viewed on 10 March 2009 <http://www.statistics.gov.uk/cci/nugget.asp?id=1866>

9 Environment Agency: State of the Environment – Wales, viewed on 10 March 2009, <http://www.environment-agency.gov.uk/research/policy/40141.aspx>

consumption rates of 130 litres a day in England and Wales, potentially reducing to 120 litres a day depending on available technology.[10]

2.6 To help achieve this, Ofwat have announced water efficiency of one litre per day for every billed property (a 23.3 Ml/d reduction annually in England and Wales) up to 2015. This could to be tackled through a range of options including operational efficiencies, household water efficiency audits and retrofitting water efficient devices. The efficiency target is most likely to be tackled through non-domestic reductions for the majority, however these targets need to be aligned with per capita reductions rather than properties to bring them in line with Government commitments.

2.7 The Code for Sustainable Homes, adopted in England in 2007 and shortly to be adopted by the Welsh Assembly Government, sets out that new public sector housing should meet a water efficiency level of 105 litres per person per day (excluding outside water use).

Consumer expectations

2.8 Since the last price review in 2004, complaints about water and sewerage services have fallen by 6.1 per cent with 86 per cent of customers saying they were satisfied, however 25 per cent of customers complained that their bills were not affordable. Affordability is a growing concern, with over half of customers in favour of competition as a means of reducing bills.[11]

2.9 Research has shown that a lower proportion of informed customers tended to view the existing service provided by companies as 'very' or 'fairly' good value for money than uninformed customers (64 per cent compared to 59 per cent) a slightly higher proportion viewed companies' draft business plans as "acceptable" (62 per cent compared to 64 per cent). Overall, only just over half of informed customers considered the proposed draft business plans to be 'very' or 'fairly' good value for money, although this was a small improvement from the 2004 price review when 45 per cent of customers rated companies' draft business plans as good value for money.[12]

Continued efficiency

2.10 The industry has been able to undertake considerable investment, often borrowing at favourable rates. However, since privatisation, bills have risen in real terms by 42 per cent. Going forward, companies' business plans would see bills rising by a further nine per cent in real terms over the period 2010 to 2015. Rolling this rate forward, bills could rise by a further 65 per cent in real terms by 2040. The industry will therefore need to continue to seek both operational and capital expenditure efficiencies.

Environment

2.11 Over England and Wales on average only ten per cent (approximately 60,000 megalitres per day in 2006-2007) of freshwater resources are used for abstraction, however in south-east and eastern England this rises to over 22 per cent of available water abstracted in 2007. There are significant challenges from current levels of abstraction contributing to the risk of those water bodiesfailing to meet the 2015 objectives of the European Union Water Framework Directive, this is an issue in some areas for a number of lakes, rivers and estuaries and in particular groundwater.[13] 15 per cent of catchments in England and Wales are over-abstracted –

10 Department of Environment, Food and Rural Affairs, Future Water, 2008, viewed on 10 March 2009, <http://www.defra.gov.uk/environment/water/strategy/pdf/future-water.pdf>

11 Ofwat and the Consumer Council for Water, Research into household customers' views on competition in the water and sewerage industry – final report, 2008, viewed on 26 March 2009,<http://www.ofwat.gov.uk/competition/pap_rsh_hhcompview.pdf >

12 Consumer Council for Water Understanding customers' views: PR09 quantitative research into customers' priorities – overall report, 2009, viewed on 10 March 2009, <http://www.ccwater.org.uk/upload/pdf/PR09_Overall_Report_Final_Feb_2009.pdf>

13 Department of Environment, Food and Rural Affairs, Future Water, 2008, viewed on 10 March 2009, < http://www.defra.gov.uk/environment/water/strategy/pdf/future-water.pdf>

mainly south-east, eastern England (eight per cent are over-abstracted in Wales). Abstraction has been identified as an impacting factor on many important wildlife sites, particularly in already water scarce areas.[14] There are significant opportunities for water plentiful areas, such as parts of West Wales, to export bulk supplies of water to neighbouring water stressed areas.

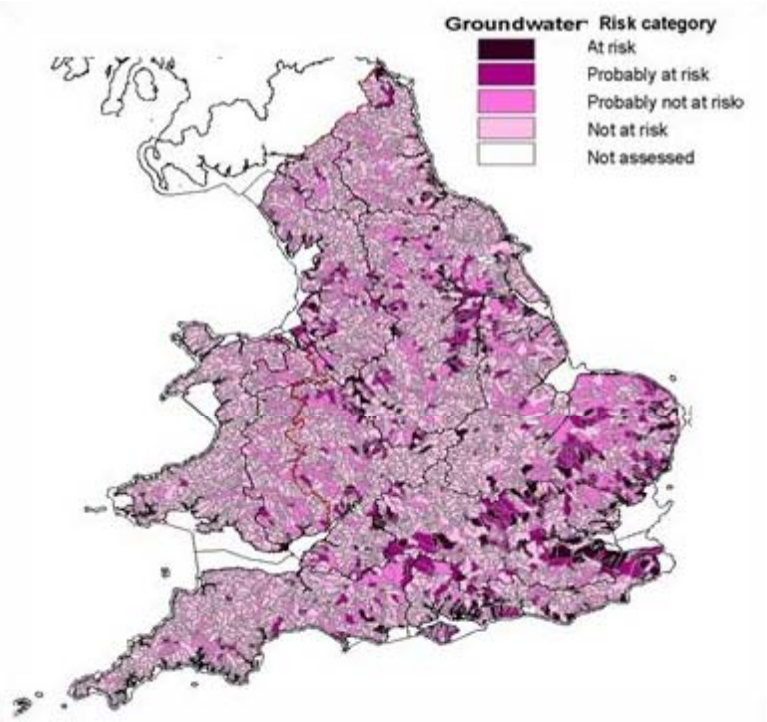


Figure 2.C: Surface water bodies at risk of over-abstraction

2.12 Groundwater and surface water pollution is an on-going concern, with point-source pollution in the short-term requiring increasingly stricter discharge consents to meet environmental objectives. Likewise, diffuse pollution is having a significant impact on the environment; for example, almost a fifth of rivers are at risk of failing to reach the Water Framework Directive's 'good ecological status' by 2015 due to diffuse pollution.[15]

14 Environment Agency, Water resources in England and Wales – current state and future pressures, 2008, viewed on 10 March 2009 <http://publications.environment-agency.gov.uk/pdf/GEHO1208BPAS-e-e.pdf >

15 Ibid

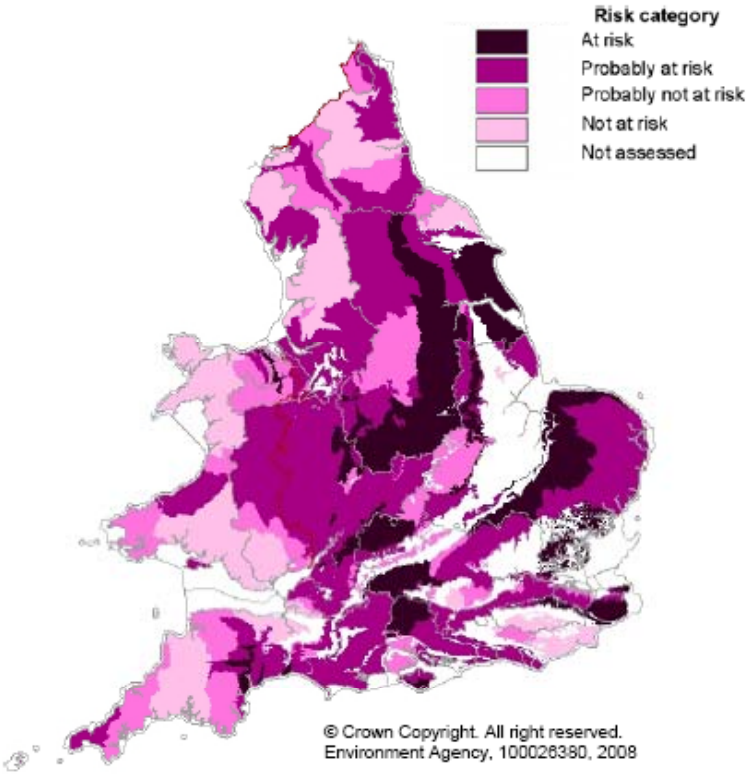


Figure 2.D: Groundwater bodies at risk of nitrate pollution

Resource management

2.13 Continued investment is required by water companies to secure sufficient supply of a high enough quality. Many companies' water resource management plans see the need for significant investment to develop new sources of water and upgrade existing treatment facilities over the next 25 years. The establishment of a national water grid has for now been assessed as cost-ineffective and highly energy intensive.[16] However, companies are developing greater inter-connectivity to improve the supply-demand balance and the resilience of supply security.

Water companies will need to focus on catchment-scale solutions, working with other stakeholders such as farmers and other landowners, to deliver the best outcomes for the consumer and the environment. Greater integration and sharing of research and development outcomes within the industry and with other sectors and stakeholders is necessary to promote more energy efficiency, innovation and sustainable solutions, tackling the risk of pluvial and fluvial flooding, water pollution and depleted groundwater levels caused by traditional drainage systems. Winter rainfall in some areas is predicted to increase by as much as 80 per cent by the 2080s, increasing the risk of flooding and direct pollution from drainage systems ill-equipped to cope with increased pressures. By the 2080s flood risk could increase from between two and twenty times. Sustainable drainage systems seek to reduce flood risk and improve water quality by mimicking the natural movement of water through source control and prevention techniques, permeable conveyance systems, green roofs and passive treatment systems.

Conclusion

2.14 These challenges are undoubtedly daunting, but not insurmountable, and there are real opportunities for change that will require process flexibility and inspired innovation while maintaining a reliability consistent quality of supply. In the face of these challenges and

16 Water UK: National water grid, 2007, viewed on 10 March 2009, <www.water.org.uk/home/policy/positions/national-water-grid >

opportunities, it is right to consider whether the present industry model remains fit for purpose, or whether there is a role for further competition, the greater use of market-like mechanisms or the reform of the current system of monopoly regulation.

3 Abstraction and discharge

Introduction

3.1 In line with the Review's terms of reference, the following chapter considers the case for reform of the abstraction licensing and discharge consent regimes. The aim of such reforms would be to facilitate the entry of alternative suppliers with new approaches to the delivery of water and wastewater services. Reforms should also lead to more efficient use and allocation of that water more generally and improve environmental outcomes by encouraging the sustainable abstraction of water, and the more sustainable and less intensive treatment of wastewater. This could be achieved by:

- tackling unsustainable amounts of water that can be abstracted as a pre-requisite for freer trading of abstraction licences;
- encouraging more efficient allocation of abstraction licences and discharge consents through greater trading and through other mechanisms to ensure these are allocated to those who value them most (including entrants to the water industry) and used in a way that most benefits society and the environment; and
- modifying discharge consent conditions so that they more closely reflect the impact on the environment.

Current situation

3.2 Abstraction licences are allocated on a first-come, first-served basis. Many licences were issued in perpetuity, although since 2001 all new licences have been time limited. Abstraction charges are designed to recover the Environment Agency's costs of administering the system and are set on a regional basis. In 2007, these raised £106 million in England and £18 million in Wales. Licence conditions and the system of charges are relatively crude. For example:

- charges account for assumed 'loss factors' which are designed to proxy the consumptiveness (that is, the degree to which abstracted water is returned to the water body close to the point of abstraction) of different abstractions made for different purposes. This proxy is generally not an accurate measure of environmental impact as it does not account for where or how much water is returned to the water body; and
- there is no differentiation in charges based on scarcity, environmental sensitivity or social value.

3.3 The availability of licences is determined at a local level using Catchment Abstraction Management Strategies. These are used to inform whether each sub-catchment area has water available, does not have water available, is over-licensed or over-abstracted. Potential abstractors can apply for a licence from the Environment Agency and, where water is available, the Agency will normally issue a licence where there is demonstrable need. Where water is not available, the catchment is over-licensed or over-abstracted, it is unlikely that a licence will be issued without

restrictive conditions, although a decision will be made on a case-by-case basis - and applicants have the right to appeal to UK or Welsh Ministers.[1] Although a large share of over-abstracted and over-licensed catchments are in the south and east of England, there are instances in other parts of England and in Wales. For example, while the west of Wales tends to have water available, parts of eastern Wales have 'no water available' with a number of catchments over-licensed and over-abstracted.

3.4 Abstractors can gain access to abstraction licences by trading licences either temporarily or permanently or aggregating rights.[2] As recent research by Ofwat and the Environment Agency found, this can be a complex and time consuming process, taking up to six months (see Box 3.A).

Box 3.A: Barriers to trading

Research funded jointly by Ofwat and the Environment Agency has looked at the potential for more active water rights trading.[3] The research categorises barriers to trading into passive and active barriers. Passive barriers include the lack of a visible market, an inability to see the value in trading, lack of understanding of the process, hoarding for future uncertainty and the existence of alternatives to trading. Active barriers include the feasibility of making suitable trades, the restrictions placed on trading and the reduction of rights at the point of trade, the difficulty and complexity of the trading process, and broader barriers which prevent the market from developing for example obstacles to upstream competition such as the current access price. The recommendations were:

- removing barriers to the establishment of a central market-place for trading water rights;
- providing easier access to better information about licences;
- establishing an independent body to facilitate the trading process;
- establishing a value of water rights and increase the cost of holding a licence; and
- standardising the trading process.

3.5 In those areas where particular abstractions are causing or risking unacceptable environmental damage by, for example, damaging or potentially damaging Habitat Directive sites, Sites of Special Scientific Interest and local sites, the Environment Agency has introduced the Restoring Sustainable Abstraction programme. This is funded by the Environmental Improvement Unit Charge which is expected to cost £450 million over the coming years, of which £41 million will be in Wales.[4] However, the programme does not target catchment-wide problems of abstraction, where there may be general cases of over-abstraction by multiple users.

3.6 The Environment Agency also has regulatory powers to promote better allocation and use of water rights, including:

- reallocating water between water companies in the interests of greater efficiency in the use of water resources;
- promoting bulk supplies between water companies; and
- requiring abstractors to enter into operating arrangements.

1 Environment Agendy and Ofwat: Exploring views on the potential for more active water rights trading, 2008, viewed on 10 March 2009, <http://217.199.176.110/aboutofwat/submissionsresponsesevidence/pap_rsh_syndovatedec08.pdf>

2 Environment Agency: Accessing water resources, 2007, viewed on 10 March 2009, <http://www.environment-agency.gov.uk/static/documents/Business/wrt_leaflet_1875063.pdf>

3 Synovate UK: Exploring views on the potential for more active water rights trading, 2008

4 Environment Agency: Review of the Water Abstraction Charges Scheme 2007, viewed on 10 March 2009, <http://www.environment-agency.gov.uk/static/documents/Research/technical_document_1856246.pdf>

To date, the Environment Agency has not made extensive use of these powers.

3.7 As described in the interim report, the UK Government will shortly be consulting on the time limiting of licences. This is intended to tackle the environmental problems of abstraction by allowing the Environment Agency to modify abstractors' licence conditions on reissue of a licence (or not reissue the licence at all), if the abstraction is doing environmental damage.

3.8 Discharge consents are also allocated on a first-come, first-served basis according to need where the Environment Agency considers that such discharges would not result in environmental harm to receiving waters. Charges are designed to recover the Environment Agency's costs of administering the system and are set on a regional basis. In 2007 these raised £65 million. Consents are normally issued in perpetuity, although a consent holder can apply for a variation of their consent at any time. While the Environment Agency can review discharge consents at any time, it may only revoke or modify a discharge consent without a consent holder's permission four years after the date of issue. Licence conditions are relatively crude. For example:

- there is no differentiation in charges based on scarcity, environmental sensitivity or social value. For example, the impact of a particular pollution load might be seven times greater in a Natura 2000 site than in a less environmentally sensitive area;[5] and
- there are limits to the level of pollution in discharge, irrespective of current flow conditions. This limit is based on overall statistical variability of river and discharge flow and water quality throughout the year, and must be met 95 per cent of the time.

3.9 At the current time, there is no mechanism for discharge consent trading. In many cases the cause of water quality issues can be attributed to one particular source so trading would not be appropriate. However, in locations where the discharge of pollutants arises from multiple sources then there could be scope for trading. Trading could be beneficial where there are limits on further discharges. For example, In England just under a quarter of lakes, rivers and coastal water and just under half of estuaries are at risk of not meeting the Water Framework Directive's 'good ecological status' standard by 2015 due to point-source pollution. In Wales, four per cent of lakes, 12 per cent of rivers, 17 per cent of coastal waters and 47 per cent of estuarine waters are at risk. Similarly, a high percentage of water bodies are at risk of failing of failing to meet the 'good ecological status' standard by 2015 due to diffuse pollution. The Environment Agency, as part of its Review of Consents is investigating whether discharges and abstractions are having an impact on Special Areas of Conservation and Special Protection Areas and after assessing whether a discharge was having a harmful impact on the site, and considering the disruption and cost to permission holders, may affirm, modify or revoke a discharge consent. There are 85 Special Areas of Conservation and 17 Special Protection Areas in Wales, and 228 and 78 sites in England, respectively. This includes such sites as the Severn Estuary, Craig yr Aderyn, and the New Forest.[6]

Result

3.10 In the one-third of catchments where there is 'water available', the Environment Agency will issue a licence and there are unlikely to be concerns that water resources have been misallocated. In the other two-thirds of catchments there are restrictions placed on the issue of new licences (or they are not issued at all), so that the allocation of licences across users is likely

5 Natura 2000 sites are European sites protected under the Habitats Directive as Special Areas of Conservation (SAC) and under the Birds Directive as Special Areas of Conservation (SPA)

Environment Agency: Discharge Consents, 2008 (internet content).

6 Joint Nature Conservation Committee, viewed on 10 March 2009, <http://www.jncc.gov.uk/page-4>

to be inefficient in terms of maximising the value of water and minimising the impact on the environment. This potential misallocation of water resources and impact on the environment arises because:

- there are no financial incentives to move points of abstraction or transfer water from areas where water is abundant to where water is scarce, since the abstractions charges do not reflect scarcity;
- there is little incentive to alter the timing of abstractions to reflect the impact on the environment. For example, where a year-round licence has been issued then there is no financial incentive to alter the timing of abstraction from the summer to winter;
- since abstraction charges tend to be low there is little incentive to hand back unused or under-utilised licences or ensure that high-value users will get a licence;
- since abstraction charges do not accurately reflect the consumptiveness of abstractions there is consequently no economic incentive to reduce the impact on river flows over the smallest distance possible;
- the present process, under Section 52 of the Water Resources Act 1991[7], for amending or revoking an abstraction licence is bureaucratic; for example the appeal process can take around two years and may cost around £50,000 to £100,000 for both the Environment Agency and abstractor. This limits the speed with which sustainable abstraction levels can be achieved;
- if time limiting of licences is introduced, this will only start to have an impact on over-abstraction starting in the 2020s, continuing into the 2030s and 2040s with each cycle of licence reviews. Until abstractions are brought to a sustainable level there will be impacts on the environment (see box 3.B);

Box 3.B: The River Itchen catchment

The River Itchen rises from the chalk aquifer of the Hampshire Downs. The river has been designated as a Special Area of Conservation under the European Union's Habitats Directive by virtue of the international significance of the chalk stream ecology. Due to over-abstraction public water supply licences may need to be altered and hands-off flow conditions are likely to be imposed at all times of the year. Climate change could place continued pressure on abstractions, since 'natural' flow levels are likely to reduce. For example, under one 'high climate change' scenario river flows could fall such that the proposed hands-off flows levels occur increasingly frequently with consequent impacts on abstractors.

- recent research by Ofwat and the Environment Agency has identified that there are significant barriers to trading;[8] and

7 Office of Public Sector Information: Water Resources Act 1991, viewed on 10 March 2009, <http://www.opsi.gov.uk/ACTS/acts1991/ukpga_19910057_en_6#pt2-ch2-pb9-l1g52>

8 Synovate UK: Exploring views on the potential for more active water rights trading, 2008

Box 3.C: Severn Trent's approach to trading

Severn Trent has recently carried out analysis and identified changes that could facilitate greater upstream competition. This work has led to the development of an outline trading model, supported by a national network code which could bring benefits both to the environment (through reducing pressure on water stressed areas) and customers (through reducing the capital investment on water resource schemes where there are cheaper alternatives). The analysis so far has suggested that it could be economic to transfer water between water company regions in certain circumstances in order to improve the use of resources nationally on a lowest marginal cost basis. Building interconnecting infrastructure at targeted locations would both be economic and over time increase interconnectivity, providing the potential for more opportunities to enter the market.

- increasing restrictions placed on new licences to protect the environment such as hands off flows or limited volumes mean that new abstractors, including potential entrants to the water industry, are bearing a disproportionate share of the costs of protecting the environment. In a competitive situation this could put them at a disadvantage.

3.11 The system may also be overly restrictive, since licences may not be issued (or only issued with restrictions such as hand-off flow conditions, or limited to part of the year), even when the issue of a new licence is unlikely to lead to actual over-abstraction and flow conditions would suggest more water could be abstracted with little or no impact on the environment.
For example, an over-licensed catchment is defined as one where, should all abstraction licences be fully utilised, this would lead to 'unacceptable damage to the environment'. However, this assessment does not account for the low probability that all licensed capacity will be used. Average utilisation of licences is below 50 per cent, and even in a dry year, such as 2005, average utilisation was only 46 per cent in England and Wales (42 per cent in Wales).[9] Moreover, there are 782 licences in England and 84 in Wales for more than 50 megalitres a year that are not currently being used (so called 'sleeper licences').

3.12 As a result, the number of licences being issued has fallen considerably (by around two-thirds) over the last 10 years in both England and Wales, despite the increasing number of licences being reissued.[10] This could reflect the increasing difficulty in acquiring licences in some areas.[11] Examples of resulting allocative inefficiency cited to the Review include:

- lack of abstraction licences are placing constraints on expanding businesses, whilst some users only make occasional use of their licences or lose significant amounts of water to leakage;
- some users have to use mains water since they cannot acquire an abstraction licence;[12]
- farmers and amenity businesses are building reservoirs at a cost of up to £6 per cubic metre. Storage reservoirs supply around 30 per cent of water for irrigation;[13] and

9 Although utilisation may vary across catchments and at different times of the year.

10 Department of Environment, Food and Rural Affairs, viewed on 10 March 2009,http://www.defra.gov.uk/environment/statistics/inlwater/iwabstraction.htm

11 Anecdotal evidence would support this. One farmer believed that no licences had been issued for summer abstractions in that catchment for the last 20 years. The Environment Agency do not collect data to verify this, but thought that of the approximately 1,500 licences issued in the last 10 years or so, these would be largely licence reissues, trades, or for winter storage

12 Submission to Cave Review by National Farmers' Union

13 E K Weatherhead: Survey of irrigation of outdoor crops in 2005 - England and Wales, 2007, viewed on 10 March 2009, <http://www.ukia.org/eeda_files/EWirrigationsurveyfor2005.pdf>

- the value of an abstraction licence (the right to irrigate) is reflected in agricultural land values (rather than licence values).[14] This reflects a barrier to trading licences and implies that in order to acquire the licence, it may be necessary to buy the land (and associated assets) too - which is likely to be costly.

3.13 The combination of restrictions on new licences being allocated in many catchments, poorly functioning trading system and incentives for hoarding licences means the scope for competitive entry and therefore upstream competition is severely limited. Time limiting of abstraction licences would help deliver environmental benefits. The UK and Welsh Government will need to consider the duration of these licences and how licences will be reissued in order to deliver quicker wins for the environment whilst minimising regulatory uncertainty which could affect incentives to make investments with long payback periods.

3.14 Where a discharge consent is likely to be granted then the present system is unlikely to have an impact on allocative efficiency. However, where there are restrictions on increasing discharges or issuing new consents then meeting the desired environmental outcome may not occur at least cost and the present system may create a barrier to entry. This is because discharge consents do not take account of the (marginal) environmental impact on the receiving body or balance the supply and demand for such consents, nor can they be traded. Research sponsored by the Review gives two examples of water quality trading schemes.[15] Box 3.D summaries one of these schemes. Trading is not permitted between point-source polluters, such as water companies, and emitters of diffuse pollution, such as farmers. Nor does the regulatory regime encourage such trades.[16]

3.15 The experiences of the Hunter River scheme (Box 3.D) suggests that the use of end of pipe standards may incur additional economic and environmental costs over more flexible standards reflecting conditions in the receiving body. If water companies are carrying out treatment to a higher level than is necessary to safeguard the quality of the water, then consumers are paying higher prices to cover the extra cost. The additional chemical treatment and energy required also places extra burden on the environment through greater carbon intensity in the treatment process.

Box 3.D: Hunter River Salinity Trading Scheme

The Hunter River Salinity Trading Scheme is a tradable emissions permit scheme that has been introduced in New South Wales, Australia. The trading scheme allows point-source emitters to trade discharge permits, where aggregate emissions are capped in order to achieve water quality targets. The emission caps depend on location (on the proximity to drinking water sources or other high value assets such as wetlands) and vary with flow conditions which is monitored in real time. Discharge consents are based on the percent of the aggregate allowable emissions. The outcome has been that new developments have occurred in the region which most likely would not have been possible without such a flexible economic incentive. Moreover, the target salinity level has been exceeded less frequently (down to 4 per cent of the time from 35 per cent of the time) and average salinity levels have reduced by 20 per cent.

14 Submission to Cave Review by Place UK Ltd.

15 London Economics, Innovation in the water industry in England and Wales, 2009

16 Submission to Cave Review by Wessex Water

Interim Report Emerging Findings

3.16 The interim report highlighted that while the present abstraction and discharge frameworks had a number of advantages, such as low costs to administer and consequently low charges, they did not always achieve the desired objectives set out above. It suggested that there would be significant environmental and economic gains if abstraction and discharge consent charges more fully accounted for the social, economic and environmental costs of water abstraction and wastewater discharge.

3.17 To achieve this, the report discussed removing barriers to trading abstraction licences, for example by giving an indicative guide to modifications to licences and where possible limiting modifications to the direct environmental impact and impact on other users of the trade itself. It also considered possible reforms of the current system of charging including allowing charges to rise above those required for cost-recovery, changing the basis of charging from licensed to actual volumes abstracted, better coordination between abstraction and discharge prices and the use of reverse auctions. The report discussed how any increases in charges could best be used to support social and environmental outcomes. The interim report expressed concern that some regulation may be unnecessarily prescriptive or risk averse, to the overall detriment of the environment, the economy and the consumer.

3.18 The interim report noted that although a focus on 'end of pipe' quality standards was appropriate to help safeguard drinking water quality such an approach to environmental standards was potentially limiting the opportunities for suppliers and companies to develop new solutions, due to the regime leaving reduced scope for water companies to manage outcomes on a catchment-wide or temporal basis.[17]

Summary of Responses to the Interim Report

3.19 The interim report asked whether reform of the abstraction licence and discharge consent regimes had merit and whether it was feasible. It also asked for views on whether more flexible regulation could stimulate greater innovation and improved efficiency and what the risks of such an approach might be.

Reform of abstraction licence and discharge consent regimes

3.20 There was general agreement from respondents that water should be better valued and that the current system of abstraction charging does not reflect all the economic, social and environmental costs of abstraction. The Environment Agency and water companies, however, were concerned about any potential impact on consumers' bills. The Environment Agency supported abstraction prices going beyond cost recovery to reflect the full value of water and Natural England argued that the abstraction licences need to signal the regional scarcity and the economic cost of water. Ofwat and Northumbrian Water noted that setting such a price through an administrative system would be difficult. Thames Water noted that the price of water needs to reflect scarcity as a prerequisite for upstream competition, that financial costs of abstraction (pumping, pipes) are already considered by companies, and the impact on the environment is reflected in costs where restrictions on abstractions are in place.

3.21 United Utilities thought that the benefits of trading could be realised even in the absence of upstream competition, although South West Water pointed out that trading of abstraction licences would support upstream competition. However, in general there was support for furthering abstraction trading. The National Farmers' Union noted that there is a danger that

17 Independent Review of Competition and Innovation in Water Markets: Interim Report, 2008, paragraph 9.29, viewed on 10 March 2009, <http://www.defra.gov.uk/environment/water/industry/cavereview/pdf/cavereview-report.pdf>

farmers might be outbid for abstraction licences, however excluding farmers would also limit their ability to sell licences. United Utilities noted that any windfalls which could arise from the sale of licences by water companies could be shared equally with customers, as is currently the case with land sales and that the Environment Agency could become a player in this market. Welsh Water noted that any income from transferring water to England could be used to reduce Welsh customers' bills. The Environment Agency stated that trading would require abstractions to be sustainable, drawing the link with other potential reforms which might help drive attaining sustainable abstractions more quickly or more cost effectively.

3.22 Ofwat and the Environment Agency made a joint response regarding water rights trading. To support further trading, both organisations will be making information regarding trading more accessible. The Environment Agency are also introducing changes to simplify and streamline the abstraction licensing process, and are also taking forward work to give a clearer indication of implications and mechanics of making a trade. Other proposals made in the joint response and that would require legislative changes were:

- to obtain and publish trade price information. This will provide information to potential traders on the potential value of their licences;
- to make payments following reverse auctions; and
- to make ex-gratia payments to abstractors who voluntarily give up licences.

3.23 The Environment Agency and South West Water raised potential issues regarding discharge trading. The Environment Agency noted that such a system could be complex given the range of chemicals which can compose discharge consents. South West Water thought that trading was unlikely to be practical because of the lifecycle of the EU Water Framework Directive.

Flexible regulation

3.24 Thames Water believed that there were various ways to improve environmental conditions during low flow in rivers, such as river restoration and catchment management measures. The Consumer Council for Water believed that the capital spent on tried and tested solutions to delivering outputs may reduce the incentives to adopt more innovative methods. South West Water argued that flexible regulation was required to stimulate innovation and efficiency. United Utilities stated that innovation needs to be more outcome-driven. Severn Trent Water noted that higher level outputs for service or performance, as opposed to defined specific activities, will allow greater scope for innovative approaches. UK Water Industry Research submitted that there should be collaboration between Government and environmental regulators to examine the practicalities of sustainable environmental standards, based on catchments. There could be a danger of excessive capital expenditure investments, to achieve over-prescriptive standards, resulting in high operating costs and negative environmental impacts.

Options for reform

3.25 As set out above, there are three objectives of reform:

- promoting sustainable patterns and level of abstractions as a pre-requisite for freer licence trading;
- increasing the allocative efficiency of water licences and discharge consents, encouraging the movement of water and facilitating upstream competition in water and downstream competition for wastewater; and
- supporting the greater efficiency of discharges.

Options for addressing these objectives are discussed below.

I. Promoting Sustainable Abstraction

3.26 Below I discuss tackling the unsustainable level of water that is abstracted from some water bodies. Tackling this is a prerequisite for a more effective trading mechanism in these water bodies since otherwise trading could present a risk to the environment. Areas to be targeted include over-abstracted areas and those areas where licence levels present a significant risk of over-abstraction (for example, if there was a significant risk that greater utilisation of existing licences could increase or because climate change meant that the sustainable level of abstraction decreased). Since the present definition of 'over-licensed catchments' used in resource availability assessments does not evaluate whether there is a significant risk of over-abstraction it is not clear the charge should apply to all over-licensed catchments.

Reverse Auctions

3.27 Under a reverse auction abstractors would offer prices to hand back or amend their abstraction licences. The Environment Agency would select the lowest cost licences to buy back to attain the desired environmental outcomes. Where market power is a concern due to too few bidders, auctions could be held across multiple catchments (and for example include multiple water companies). Auctions could be held regularly, for example every three months. In order to cap costs a 'reserve-price' as a maximum starting bid could be employed; this could be set based on the lower of a broad estimate of the value of water in the environment and the estimated compensation costs that could arise if abstraction licences were removed or altered using existing powers.[18] Reverse auctions could be funded either through revenues raised through a scarcity charge or using the present system of abstraction charges.

Negotiated agreements

Before introducing a scarcity charge in a catchment (and at regular intervals after one was introduced), the Environment Agency could facilitate negotiated agreements between abstractors in a catchment. If abstractors could agree between them how to reduce abstraction then a scarcity charge would not be required. In some cases such negotiations may be relatively straightforward, for example if one large abstractor reduces their licensed volume levels voluntarily or in return for payments from other abstractors; in other cases there may be more complex transactions, for example requiring a chain of bilateral exchanges. The Environment Agency could help facilitate negotiations and ensure that individual changes being agreed are consistent with the ultimate environmental goal.

Scarcity Charges

3.28 Under a scarcity charge, abstractors would pay a charge in areas where licensed volume levels are unsustainable. This would account for the level of licensed abstraction volume of each abstractor, and the degree of 'consumptiveness' of the abstraction. Where the proportion of abstracted water that is discharged back to the same water body is easily observable then this should be used as the measure of 'consumptiveness'; if not, then the 'loss-factors' already used to determine the volumetric component of the abstraction charge could be used instead. The scarcity charge could be applied to the total licensed volume or on the degree to which licensed volume levels are unsustainable. Box 3.E gives an example of the latter approach.

18 Office of Public Sector Information: Water Resources Act 1991, 1991 viewed on 10 March 2009, <http://www.opsi.gov.uk/ACTS/acts1991/ukpga_19910057_en_6#pt2-ch2-pb10-l1g61>

Box 3.E: Example of scarcity charging

A water body is five per cent over-abstracted. There are a number of abstractors who fully utilise their licences. A scarcity charge is applied on the last five per cent of each abstractor's licence. The charge is reduced to the extent that an abstractor discharges water back to the same water body. For example, no charge would apply to a fish farm that returned all water back to the same water body. Each abstractor could reduce their licence holdings by five per cent, choose to pay the charge, or could trade this chargeable part of the licence so some abstractors could reduce the licensed volume levels by more and some by less.[19] Since the charge applies to only the last five per cent of each abstractor's licence then the distributional consequences would be relatively small.

3.29 In the first instance, the charge could be applied at the Water Resource Management Strategy Unit level where resource availability assessments are already available. For surface waters, such as rivers, greater precision could be achieved over time by introducing a measure of distance between the point of abstraction and discharge. This would encourage abstractors to reduce the distance between abstraction and discharge points to minimise the area that is subject to a flow reduction.

3.30 For administrative ease, a single scarcity charge could be applied across all areas where water was scarce and increased slowly over time. At a later date, as charges become higher or when appropriate categorisation could occur, caps on scarcity prices could vary reflecting the differing value of water at different times and locations. In any case, to reduce regulatory uncertainty to abstractors and to maximise the impact of the charge the path of charges would need to be signalled in advance. For example, a maximum charge or cap on annual charge increases could be set.

Regulatory Instruments

3.31 Changes could be made to streamline the present process of amending or revoking abstraction licences. This could be achieved by allowing the Environment Agency to make ex-gratia payments to abstractors who voluntarily retire or amend a licence. This would enable the Environment Agency to enter into negotiations with an abstractor and which could lead to more flexible solutions which would be more attractive to both parties. In order to ensure proper accountability of public funds the Environment Agency could be limited to negotiating within certain parameters; for example, setting a cap either on the price per unit volume of licence to be returned, or on the total amount of money per licence being amended or retired, or both.

II. Promoting Allocative Efficiency and Sustainable Competition

Greater Trading

3.32 Ofwat and the Environment Agency have made proposals to reduce barriers to abstraction licence trading. Options for removing other barriers to trading include:

- publishing trade price information. This will provide information to potential traders on the potential value of their licences;
- alteration of licences at the point of trade being limited to the direct impact on the environment, rather than meeting other goals (such as over-licensing in a catchment); and

19 That the part of a licence to which the scarcity charge is identifiable and can be traded is crucial to ensure the environmental target can be achieved at least financial cost.

- introducing guidance on how licence conditions, such as hands off flows, can be traded.

3.33 A similar trading system for discharge consents could be introduced. The scope for trade will be limited to places where the same pollutants are being released a single water body by more than one party. Since the number of dischargers in one market may be small, a 'market price' may not emerge. As with abstraction licences, bilateral exchanges could be administered by the Environment Agency on a case-by-case basis to ensure that there was no increased damage to the environment. The options above for removing barriers to abstraction licence trading would be equally applicable to discharge consent trading, for example alteration of licences at the point of trade being limited to the direct impact of the trade.

3.34 Additionally, a pilot could be run which would allow trading between point-source discharges, such as water companies, and emitters of diffuse pollution such as farmers. To overcome the problems of monitoring diffuse pollution an 'exchange-rate' could be applied between expected changes in point-source and diffuse emissions. For example, an expected reduction in diffuse pollution from a farmer restricting their use of fertiliser may need to be twice as great as an allowed increase in point-source emissions due to the increased uncertainty of the environmental impact.

Risk Based Approach to Licensing

3.35 A risk-based approach to abstraction would consider the probability of each licence being used and the expected impact on the environment when a new licence was issued or a trade considered. For example, some abstractors' demand for water may increase in dry years (such as irrigators or water companies) but other abstractors' demand is unlikely to be affected (such as power stations and industry). Furthermore, so called 'sleeper licences' may continue to go unused.

3.36 With regards to upstream competition in the water industry then, in some cases, companies competing to supply water to the same customers may be expected to displace each other's demand for water. Temporary licences (for example, for five years) could be issued to entrants wishing to abstract and treat water, and pump it into an incumbent's network. Such licences could be only used for their original purpose and would not be tradable, nor would the incumbent's licence be tradable during this time. At the end of the period, where an entrant demonstrated that they had successfully displaced either part or all of an incumbent's need for water, then the licence could be made permanent and the incumbent's licence modified.

Regulatory Instruments

3.37 There is a range of regulatory tools that the Environment Agency could use to support the more efficient allocation of resources including:

- relieving incumbents of the supplier of last resort duty and transferring it to another body (such as a franchising entity or market authority described in chapter four). Unused licences would then be freed up and transferred; and
- making greater use of existing powers to reallocate abstraction licences, promote bulk water supplies and require abstractors to enter into operating agreements.

III. Promoting the Greater Efficiency of Discharge Consents

Flexible discharge consents

3.38 Discharge consents could more closely reflect environmental conditions in receiving waters, as opposed to end of pipe concentrations. Real time monitoring would provide water companies

with greater knowledge of the overall flow and pollution levels in the water body and this, together with a better scientific understanding of the impact of pollution levels on the environment, could enable water companies to make more informed decisions about how they discharge to rivers. For example, if at a particular time, flow was higher than the seasonal average and evidence suggested such a discharge would not be detrimental to the environment, water companies could be permitted to discharge a greater load than the consent currently allows. When river flows were below normal, companies would be required to reduce discharge levels or increase treatment levels.

Costs and benefits

3.39 Abstraction licensing and discharge consents affect not only water companies but also a wide range of other parties. The effects on all these groups are considered below. Generally, the aggregate level of costs and benefits is difficult to estimate reliably due to significant gaps in the evidence base. The discussion is this section aims to illustrate where benefits exceed costs of each option.

Benefits

3.40 There are likely to be considerable benefits from reform. A combination of reverse auctions, negotiated agreements and scarcity prices would tackle over-abstraction, or the risk of over-abstraction, in a cost effective way by providing incentives for all abstractors to reduce their consumption of water. This is because abstractors:

- would value water more. There would be greater incentives to use water more efficiently by reducing leaks, using less water intensive technologies, or simply choosing to use less water;
- would be given an incentive to take water from different locations or at different times, for example by moving water (environmental conditions permitting) from abundant areas to scarce areas. Water companies would be given an incentive to optimise where abstractions are drawn with greater consideration of water's environmental value; and
- could reduce their production of water intensive products, or pass on the environmental cost to the consumer.

3.41 Bringing abstraction levels down to sustainable levels could also help deliver significant benefits to the environment. For example, a number of water bodies are at risk of failing to meet the Water Framework Directive's 'good ecological status' as a result of abstractions levels. However, the improvement to the environment is difficult to predict with accuracy since impacts will depend on other factors, such as the levels of discharges and change in flows conditions due to climate change. By way of illustration, forthcoming analysis for Defra suggests that very significant benefits will flow from the achievement of good ecological status. The Draft River Basin Plans indicate benefits across England and Wales of around £170 million per annum.[20] This would suggest that reducing abstractions to sustainable levels could have significant benefits.

3.42 If the Environment Agency could make ex-gratia payments to abstractors who voluntarily retired or amended a licence, the costs of the present Restoring Sustainable Abstraction programme would be reduced. The Environment Agency could use more flexible approaches such as phasing in changes to abstraction licences over time, potentially reducing compliance

20 These benefits tend to occur in the early years (2009 to 2015) and arise as a result of the percentage of water bodies which meet good ecological status increasing from 21 per cent at present to 26 per cent in 2015. Further improvements are expected up to 2027 when the majority of water bodies would be expected to be at good ecological status or its counterpart.

costs to the licence holder (and therefore the level of compensation that the Environment Agency would need to offer). Administrative costs would also be significantly reduced as the appeal process through the Planning Inspectorate in England and the Welsh Minister in Wales, and possibly also the Lands Tribunal would be avoided. The appeal process alone can take up to two years to complete.

3.43 There would be significant benefits from increased allocative efficiency as abstraction licences and licence conditions are more freely traded and the supply of new licences increases. Licences would go to those that valued them most highly. This would allow:

- businesses who need more water to expand or to replace mains water with raw water;
- abstractors to sell unused, under-utilised licences to potential buyers;
- abstractors to use licences for the purpose they choose without unnecessary restrictions such as being required to buy the land associated with the licence; and
- uncertainty of supply (when hands off flows are imposed) to be borne by those that can manage uncertainty at least cost.

3.44 Whilst it is hard to quantify the value to users of such improvements, it is worth noting that although cost of abstraction licensing regime is relatively low (around £124 million in 2007), the value of water in the economy is significantly greater. A National Audit Office report states:

> *Many of these industries would not be possible without the use of water. To replace a supply of one million litres of water a day would typically cost about £2 million. The Agency's regulation of abstraction, therefore, protects resources worth some £72 billion to licence holders. Clearly, water use is of such importance that its value to the economy as a whole is incalculable.*[21]

3.45 Whilst such estimates indicate (in order of magnitude terms) the extractive value of water - such estimates would not be suitable as a starting point to quantify the benefits from water being allocated more efficiently. However, it is conceivable that the value of benefits (in present value terms) due to improvements in allocative and dynamic efficiency from improved licence allocations could be in the hundreds of millions of pounds. Freer trading of water will also facilitate upstream competition in the water industry, this is reflected in the cost-benefits analysis (described in annex A) which shows the net present value of upstream competition could be of the order of billions of pounds.

3.46 Likewise, there will be benefits to trading discharges. If one discharger can reduce the emission of a pollutant at less cost than another discharger (who is emitting to the same location) then there could be benefits to both parties through trading (elements of) their discharge consent. Trading based on environmental outcomes has been found to tackle water quality problems at reduced costs.[22] A survey of water quality trading initiatives in the United States identifies a number of schemes where water quality trading led to costs savings and

21 National Audit Office: Environment Agency: Efficiency in water resource management, 2005, viewed on 10 March 2009, <http://www.nao.org.uk/publications/0506/efficiency_in_water_resource_m.aspx>

22 Organisation for Economic Co-operation and Development, OECD Workshop on Agriculture and Water: Sustainability, Markets and Policies 2005, viewed on 10 March 2009, <http://www.oecd.org/secure/pdfDocument/0,2834,en_21571361_34281952_35513688_1_1_1_1,00.pdf>

environmental improvements, the costs savings from this paper are summarised in table 3.A below.[23]

Table 3.A: Cost savings in US water quality trading transactions

Agreement	Savings achieved	Location
Action	$ 2.25 million annually	Massachusetts, US
Bear Creek	Forest Hills Metropolitan District (mitigated cost of upgrading treatment facility) approximately $1.2 million	Colorado, US
Boulder Creek Trading Program	$ 3-7 million mitigation of upgrading treatment facility	Colorado, US
Grassland Area Farmers Tradable Loads Program	$ 14,320 over five years	California, US
Illinois Pre-treatment Trading Program	$ 6.9 million for one service area (estimate)	Illinois, US
Long Island Sound	$ 200 million over 15 years	Connecticut. US
Piasa Creek Watershed Project	$ 3.25 million	Illinois, US
Wayland Business Centre Permit	$ 1 million	Massachusetts, US

Source: Breetz et al.

3.47 Clearly the extent of benefits to traders will depend on the scale or trading that takes place. Since trading is a voluntary transaction between parties it will only occur if each party benefits. To ensure that the benefits to the trading parties outweighs the administration costs, and to ensure the proper financing of its functions, the costs of administering the trading process should be recovered by the Environment Agency through an administrative charge.

3.48 A flexible approach to maintaining quality standards through flexible licensing of the discharge consent offers significant potential benefit to the environment or consumers. For example, on the one hand, in times of higher river flow companies might be able to discharge with reduced treatment. This means discharges will be carried out at less financial cost. On the other hand, stricter discharge conditions might apply when flows are lower and when the environmental impact of such discharges are greater. If the timing of discharges could be tuned to reflect flow conditions, then both environmental and economic benefits could occur.

Costs

3.49 There are two types of cost associated with reverse auctions; first, there will be an administrative cost associated with running the auctions and participating in them, secondly, rents may arise if bidders can sell their abstraction licences for more than they truly value them. Administrative costs will depend on implementation but are likely to be lower than using current powers. For example, in New South Wales the primary acquisition tool is via an expression of interest process which is run annually – analogous to a sealed bid auction; the administration costs vary from around £1,400 to £3,800 per transaction.[24] The scale of potential rents to

23 H L Breetz, K Fischer-Vanden, L. Garzon, H Jacobs, K Kroetz & R Terry: Water Quality Trading and Offset Initiatives in the US: A Comprehensive Survey, 2004, viewed on 10 March 2009, <http://www.dartmouth.edu/~kfv/waterqualitytradingdatabase.pdf> cited in L Manning: Water: Managing a vital resource, 2008. Nuffield Farming Scholarships trust.

ISBN 978-1-90646-617-6

24 Submission to Cave Review by Department of Environment and Climate Change, New South Wales, Australia. Administration costs converted from Australian dollars into UK pounds Sterling. Exchange rate as of 13th March 2009.

bidders will depend on the number of bidders with similar (marginal abatement) costs. As long as the auction is sufficiently competitive it is likely to be cost effective.

3.50 A similar system to negotiated agreements has been used as part of the Catchment Abstraction Management Strategies process. Local Environment Agency officials have encouraged collaboration between abstractors about how to tackle over-abstraction. As a result facilitating negotiated agreements is unlikely to be a significant additional cost.

3.51 Information for scarcity charges is currently available, as it forms part of the abstraction licensing and discharge consents process. The administrative costs of introducing scarcity pricings are therefore likely to be low. The Environment Agency believes the set-up and on-going costs of such a framework could be in the order of £500,000. The net present value would therefore around £10 million over 30 years.

3.52 Reducing the amount of water available could impose costs on users. Where unused licensed volumes are reduced then the cost to abstractors is likely to be small (although such licensed volumes could have some 'option value'). Where abstractors need to reduce their actual levels of abstraction then costs will be greater. For example, water may need to be sourced from an alternative source, water efficiency could increase or production of the good that depends on water must decrease. Data does not exist which would indicate the extent to which the licensed volume levels would need to fall for licence levels to be sustainable. Further data may become available as the consultation on time limiting progresses.

3.53 It is not clear what the appropriate level of payments would be if the Environment Agency could make ex-gratia payments to encourage an abstractor voluntarily to retire or amend a licence. The present system can help determine what payment is appropriate by drawing on the advice of the Planning Inspectorate, and either UK or Welsh Ministers can consider whether a payment is appropriate. This reduces the risk that the appropriate payment required is over-estimated, as well as ensuring proper accountability for public expenditure.

3.54 A system of abstraction trading is already in place, and proposed changes would be alterations of the present system. For example, publishing trade prices is likely to have a minimal administrative cost, as would issuing guidance on how to transfer licence conditions. Altering licences to reflect on the direct environmental impact and impact on other users of a trade would be a change of policy and would have no administrative cost.

3.55 The process for administering discharge consent trades would be similar to the process for judging new consent application; in some ways it would be more faster and more straight forward since the overall discharge levels the water body can bear would already be determined, although the trading process would require alteration of two licences rather than one under a normal application process. Administrative costs are unlikely to be great – but in any case, such costs would be recoverable from an administrative charge.

3.56 Further research is required into the potential costs of moving from end-of-pipe discharge consent standards to standards based on conditions in the receiving body. Determining alternative solutions to discharge will require laboratory testing and then piloting of schemes, before being applied on a larger basis. This may be resource intensive. Small-scale piloting will also require appropriate controls to prevent harm to the environment. This work will help to determine the different pollution concentrations that could be permitted under the discharge licensing conditions and the extent to which variable discharge brings economic and environmental benefit to operators and consumers.

Distributional Impacts

3.57 This section focuses predominantly on the distributional impacts of a scarcity charge since, in the absence of alternative or offsetting measures there could be distributional consequences.

Table 3.B shows the projected contribution of different groups to abstraction revenues in England and Wales. The revenue share for agriculture is larger than licensed volume levels would imply (which was around 0.5 per cent of abstraction from surface and groundwater in 2005), largely due to the higher loss factor applied to certain types of irrigation.[25]

3.58 Any distributional impact is likely to fall predominantly on present licence holders because an increase in abstraction charges is likely be offset by reductions in the tradable value of the licence (assuming licences are tradable with few barriers), or in the value of land or other assets with which the licence is associated.

Table 3.B: Forecast Abstraction Revenues by Type of Abstractor, £ million, for 2008/2009 as at 23 January 2009 [26]

	England	Wales
Agriculture	£4.0m (3.3%)	£0.1m (0.8%)
Water Supply	£104.1m (85.5%)	£15.8m (92.5%)
Industrial / Commercial / Public Services	£8.7m (7.1%)	£0.9m (5.4%)
Amenity	£0.1m (0.0%)	£0.0m (0.0%)
Production of Energy	£4.8m (3.9%)	£0.2m (1.3%)
Total	£121.7m (100.0%)	£17.1m (100.0%)

Source: Environment Agency

3.59 Around 33 per cent of catchments are over-abstracted or over-licenced in England and Wales (16 per cent in Wales only). This likely to be largely an issue at lows flows in summer months for surface waters, but could be all year round issue for groundwaters.

3.60 If a scarcity charge equivalent to twice the present volumetric charge was applied to 33 per cent of licensed water by water companies, and assuming the cost of abstraction licences form two per cent of a water companys' costs, then the impact on overall water companies costs (and by implication final bills) would be in the order two-thirds of one per cent.[27] Applied to abstraction charge revenues in 2007 of £124 million, this would be an increase in revenue of around £41 million. If a scarcity charge was applied based on the degree of unsustainable licences then the impacts would be considerably lower – in the order of one-thirtieth of one per cent of water companies' costs if licenced volume levels were required to fall by five per cent on average. This would be represent an increase in revenues of around £2 million.

3.61 The impact on costs will be lower than the average estimated impact if a scarcity charge only applies for part of the year (for example, in summer) and higher or lower if a water company draws more or less of its water from areas where licence levels are unsustainable. The estimated impact will increase with the level of the scarcity charge and it is likely that the scarcity charge will have a price which is significantly higher than the current volumetric charge. These cost increases compare to the nine per cent real terms increase in customer bills implied by draft business plans over the next price review.[28]

25 In 2005/06 over 13,000 licences to abstract water for spray irrigation or other uses in agriculture were in force in England and just under 1,000 in Wales (Source: Environment Agency). This implies that average expenditure per licence was in the order of £300 a year in England and £100 a year in Wales.

26 Data for Wales is for the administrative area, Environment Agency Wales.

27 The Review is not aware of any data showing how much water is taken from catchments broken down by resource availability status, source or seasonal profile.

28 Ofwat Setting price limits for 2010-2015: overview of companies' draft business plans, 2008, viewed on 10 March 2009, <http://www.ofwat.gov.uk/pricereview/pr09phase2/pr09phase2pubs/sub_bpd_pr09summary.pdf>

3.62 The market value of electricity accounted for £27 billion in 2007.[29] Current abstraction charges (and any likely increase due to a scarcity charge) make up an insignificant share of total industry costs. Likewise, the share of abstraction charges in total costs for other users, such as farmers, tends to be small.

3.63 With a negotiated agreement, a scarcity charge would be avoided. This would reduce, though not eliminate, distributional impacts. These distributional concerns could be reduced further depending on how revenues are spent. For example, if revenues were used to fund reverse auctions then there would likely be winners as well as losers, and if water company revenues raised from selling abstraction licences were shared with customers then the impacts for this group may be positive. However, it would be for Government to consider how to make use of any revenue raised.

Evaluation

3.64 I believe that there are likely to be significant benefits from promoting sustainable abstraction and that reverse-auctions are an attractive option for the reallocation of water rights compared to other procurement mechanisms such as negotiated individual transactions since they have the potential to minimise costs of water rights acquisition in information-poor environments and ensure that rights are sold by those that value them least.

3.65 However, reverse auctions are likely to provide only part of the solution, since it may not be possible to target all catchments. Where possible, abstractors should be given the opportunity to negotiate the necessary reductions between themselves with the support of the Environment Agency. In those cases where this was not possible, a scarcity charge would be appropriate to:

- reduce the demand for abstraction licences or increasing discharges in over-abstracted areas;
- create incentives for abstraction and discharge points to be moved closer together to reduce the impact of reductions in river flows;
- create a cost to holding onto abstraction licences which would encourage trading; and
- reduce the incentive for hoarding of licences which would enable upstream competition.

3.66 To reduce the impact of introducing a scarcity charge, it could be introduced at a low, uniform rate and gradually increased over time in order to achieve balance. This would reduce the costs associated with stranding sunk assets, allow time to respond, and reduce distributional issues.

3.67 Simplification of Section 52, for example allowing ex-gratia payments, could potentially offer benefits in terms of expediting the Restoring Sustainable Abstractions programme and reducing costs. Such simplification will need to consider how to determine the right level of payments, and to ensure proper accountability of public expenditure. One solution would be to allow the Environment Agency to make payments within certain limits. Such simplification will need to consider how to determine the right level of payments, and to ensure how to ensure proper accountability of public expenditure. The Government will wish to consider how to make use of any revenue raised.

29 Department for Business Enterprise &Regulatory Reform: Digest of UK Energy Statistics 1.4, viewed on 10 March 2009, <http://www.berr.gov.uk/whatwedo/energy/statistics/source/total/page18424.html>

3.68 The Government will wish to consider how to make use of any revenue raised. Options include increasing the responsiveness to the charge for example, by subsidising a transition to less water intensive forms of irrigation; mitigating increases in bills or other distributional consequences by recycling revenues; offsetting water companies' other costs or returning revenues to customers.

3.69 Where licence levels are sustainable an effective trading scheme will be the best means of ensuring licences go to those abstractors who value them most. This is because the value of water to abstractors varies between users, locations and at different times. Market prices are more likely to reflect the value(s) of water to users than an administrative approach to pricing. Markets need information to function properly. Trading can be facilitated further by providing more information to the market by publishing trade prices – this will indicate the value of licences in trade and encourage participation in the market. Issuing guidance on how licence conditions (such as hands off flow conditions) can be traded means that those who place the most value on a reliable supply of water could be able to acquire it and it will eliminate a barrier to entry to the water (and other industries) where a reliable supply of water is key. Furthermore, eliminating the 'tax on trading' so abstraction licences such that licences are only altered to reflect the direct impact environmental impact or the impact on other abstractors of the trade will eliminate a great disincentive to trade.

3.70 Issuing temporary licences to water company entrants, with proper restrictions, would facilitate upstream competition in the water industry whilst protecting the environment. Furthermore, formal consideration of the risk licence levels present to the environment when considering new licences or trades could eliminate unnecessary restrictions. As levels of abstraction approached (or exceeded) the limits of sustainability then the Environment Agency could stop issuing new licences to mitigate the risk of an impact on the environment.

3.71 Regulatory instruments could also play a role. Relieving incumbents of the supplier of last resort duty (when other changes to the structure of the water industry are made – see Chapter four) would free up licences. The Environment Agency could also make use of its powers to reallocate licences to enable entrants to get hold of under-utilised licences of incumbents. As the market develops the Environment Agency and Ofwat could consider if further mechanisms and powers are required to overcome the incentive to hoard licences.

3.72 Overall, the administrative cost of allowing discharge trading is expected to be small, although the precise cost will depend on the size of the market. However, to the extent that trades did place additional administration costs this would be recovered through an administrative charge. A risk-based approach to issuing licences could come at a small administrative cost in terms of estimating such risks. As levels of abstraction approached (or exceeded) the limits of sustainability then the Environment Agency could stop issuing new licences to mitigate the risk of an impact on the environment.

3.73 Discharge standards have been set based on limited and generalised scientific understanding. If there was more information about the link between discharges and the impact on the environment then discharge consents could be made more flexible leading to either improvements to the environment or reducing the cost of meeting environmental targets or both. For example, allowable discharges could reflect flow conditions, allowing greater discharges when the river is in flood and lower discharges when there are low flows.

3.74 As discussed above, although scarcity of water is more common in the south and south east of England, it also prevalent in other parts of England and also in parts of Wales. For example, there is 'water available' in 30 per cent of catchments in England and 46 per cent in Wales. In the remaining catchments water rights are unlikely to be used or allocated efficiently at a cost to the environment and the economy. With regard to discharge, trading would improve efficiency in those areas where no additional consents are available in both England and

Wales. Reform of discharge consent conditions could also potentially reduce costs for all water companies.

Recommendations

3.75 In those areas where licence levels are unsustainable, the Environment Agency should be permitted to run reverse auctions. This would be initially on a pilot basis. In those areas where negotiated agreements failed to reduce licence levels, a scarcity charge should be introduced on an administrative basis and increased over time until abstractions are sustainable. Legislation should be introduced to allow the Environment Agency to increase abstraction charges beyond cost recovery. When abstractions fall to a sustainable level, the charge would fall to zero.

3.76 The UK Government and Welsh Assembly Government should consider whether simplification of Section 52 of the Water Resource Act, for example by allowing the Environment Agency to make ex-gratia payments, can reduce unnecessary administrative costs whilst ensuring appropriate accountability of public funds.

3.77 I recommend that, in catchments where licence levels are sustainable, licences should be fully tradable subject only to modification for direct environmental impacts or impacts on other users from a change of use or location. The Review welcomes the work by Ofwat and the Environment Agency on reducing the barriers to trading and supports the provision of more information, improving the administrative process and giving traders more confidence about the rights licences signify. To achieve this, legislation should enable the Environment Agency to collect and publish trade prices to provide greater information to traders about the potential value of licences.

3.78 In order to balance protecting the environment against competing extractive uses of water and to facilitate greater competition, I recommend that the Environment Agency should take forward a more risk-based approach to allocating abstraction licences. This would consider the likelihood of allocated licences being under-utilised or utilised at different times. If an independent contracting organisation was introduced then incumbents could be relieved from the supplier of last resort duty. Until such time, the Environment Agency should make use of its existing regulatory powers to reallocate abstraction licences to facilitate upstream competition.

3.79 In the longer term, if the government were to introduce time limiting of all abstraction licences then this could help deliver environmental benefits. The UK and Welsh Government will need to consider the duration of these licences and how licences will be reissued in order to deliver quicker wins for the environment whilst minimising regulatory uncertainty which could affect incentives to make investments with long payback periods.

3.80 Discharge consent holders should be able to trade their discharge consents on a pollutant basis subject only to modification for direct environmental impacts from a change of location (for example, the benefits of greater discharge upstream). In addition, a pilot should be run to investigate the potential of trading between point source and diffuse emissions. Discharge consent conditions could also better reflect the impact of discharge on the environment. I would recommend further research, including pilots, to establish the costs and benefits of more flexible licensing conditions for example based on flow volumes and water quality conditions.

3.81 These measures would encourage the efficient and sustainable abstraction of water across England and Wales by encouraging incumbents and others to exploit differences in availability and price of water and alternative measures (such as leakage control and demand management) to meet supply at lowest economic and environmental cost. This would include not only the optimisation of water resources within company boundaries, but also between companies through the transfer of raw water. They would also support the more efficient and sustainable discharge of wastewater delivering benefits to both customers and the environment through

reducing the cost of meeting consents, encouraging the discharge of water where it was of most value and reducing the need for inputs such as chemicals and energy in existing treatment works and decreasing pressure for new capacity.

4 Upstream

Introduction

4.1 In line with the Review's terms of reference, the following sections consider the case for reform of the upstream elements of the value chain. This includes water treatment, distribution, collection, wastewater treatment and sludge treatment and disposal. The aim of such reform would be to benefit customers through lower costs and improved standards and to reduce the impact of such activities on the environment by, for example, reducing the need for inputs and the more efficient use and allocation of water. This could be achieved by:

- ensuring production by new and existing assets, and construction of new and replacement assets, is achieved at lowest economic and environmental cost;
- optimising the use of existing or new assets; and
- increasing the growth rate of efficiency, quality or service level over time.

4.2 This could be through competition, market-like instruments or regulation. As approximately of one-third of customers' bills are used to meet water companies financing costs, any such change must more than offset any impact on the cost of capital.

Current situation

4.3 Upstream services can be delivered through:

- the local incumbent's own supply;
- bulk supply agreements where a neighbouring incumbent supplies the local incumbent with a supply of raw or treated water (and potentially wastewater);
- inset appointments where an inset appointee replaces the local incumbent for provision of services and infrastructure in a given geographical area (see chapter six);
- combined supplies where a water supply licensee uses an incumbent's network to input water and then sell it to customers within the incumbent's area of appointment;
- self-supply where a company or individual develop their own private supply and treatment and disposal facilities; and
- pre-treatment where a non-household customer undertakes partial or total treatment of wastewater on site before discharging into an incumbent's wastewater network.

4.4 However, there are a number of barriers to new entry for such supply, including:

- given regional average pricing and a regulatory capital value discount of around 80 per cent, the incumbent can often supply new and existing services at lower cost

than alternative options, even where on a depreciated modern equivalent basis they would be less efficient;

- by focusing on short-term avoided costs, the costs principle fails to offer alternative providers a fair return for the services they offer, although it also ensures that total costs do not rise as a result of entry. It can also take a significant time to agree an access price;
- as set out in chapter three, the administrative pricing of abstraction licenses fails to reflect the actual value of water;
- in those areas where alternative supplies would be most valuable, it is often difficult for alternative providers to gain access to abstraction licences (and potentially discharge consents);
- the financial benefits to the incumbent of developing capital, as opposed to operating, expenditure solutions to meet new challenges;
- incumbents have regulatory and legal incentives to develop their own capacity. To the extent that alternative supplies fail to offer the same degree of supply security, companies using such supplies increase their risk of failing to supply customers with water and wastewater services thereby potentially failing their supplier of last resort responsibility and incurring performance level fines from Ofwat;
- buying other supplies rather than developing their own resources would increase an incumbent's operating expenditure, reducing their comparative efficiency;
- in the case of inset appointments, appointments are restricted to users likely to use more than 50 megalitres a year in England and 250 megalitres a year in Wales, unserved sites and sites where the incumbent consents to an appointment;
- in the case of infrastructure, except in the case of an inset appointment, a contractor must sell or give new infrastructure to the local incumbent; and
- there are significant information asymmetries, alternative suppliers often have little information on which to decide whether, where and how to enter;

4.5 As a result, in spite of supply excesses in some companies and deficits, bulk supplies have remained broadly constant at around four per cent of distribution input since the early 1990s. To date, there have been no combined supplies and there have only been 18 inset appointments, none of whom have chosen to develop water or wastewater services. Apart from insets, there is limited competition for infrastructure provision and no competition for infrastructure ownership. Supply is therefore dominated by the local vertically integrated incumbent.

4.6 Prices, service and quality standards and environmental outcomes are therefore driven by regulation rather than market mechanisms (although companies may use market-like mechanisms when outsourcing activities). Ofwat regulates service and infrastructure standards through undertakers' licence conditions and encourages improved performance through a price review settlement designed only to meet the costs of an efficient company and incentives that allow companies to retain capital or operational out-performance efficiencies for five years (or seven and a half-years in the case of a frontier company).[1]

1 Ofwat: Setting water and sewerage price limits for 2005-10: Framework and approach, 2003, viewed on 10 March 2009, <www.ofwat.gov.uk/pricereview/pr04/pr04phase1/pap_pos_pr04pricelim270303.pdf >

4.7 For a capital investment with a life span of 20 years a company will receive around 30 per cent (or 40 per cent in the case of a frontier company) of the net present value of a successful cost saving innovation, but this falls proportionately as the asset life increases. For operational savings, particularly where a new way of working is likely to have an on-going benefit longer than the typical life of an asset, the benefit to the company could be even less. Cost overruns or the use of failed innovative technology or processes are met solely by shareholders.

4.8 As part of the 2009 periodic review, Ofwat is introducing the capital expenditure incentive scheme, a form of menu regulation.[2] This provides companies with increased returns depending on their declared level of outperformance compared to an efficient company and treats over and under performance from the company business plan symmetrically. Rewards for companies under the capital expenditure incentive scheme would, for a £1 billion capital investment programme with 10 per cent out-performance, be around £37.5 million. This compares with the current regime where a 10 per cent out-performance by a frontier company would result in a reward of £37.5 million or £35 million for a non frontier company. While, under the current regime, a 20 per cent outperformance would lead to twice the gain of a 10 percent out-performance of between £70 and £75 million, under the capital expenditure incentive scheme a company would earn £77.5 million, irrespective of whether they were a frontier company or not.

4.9 Ofwat produces efficiency rankings for both operating and capital expenditure using actual costs and explanatory variables for operational expenditure and the cost base for capital expenditure. Out-performance of operating expenditure for the ranges from 15 per cent out-performance to 12 per cent under-performance with an average of around two per cent out-performance. For capital expenditure an equivalent range is for out-performance of 21 per cent through to a slight under-performance of one per cent, with an average of nine per cent out-performance.[3]

4.10 The Drinking Water Inspectorate and the Environment Agency ensure compliance with drinking water and environmental quality standards, and will fine or prosecute a company that fails to meet such standards. In addition the UK and Welsh Assembly Governments and the regulators seek additional economic, environmental and health outcomes.

Result

4.11 This upstream framework, dominated by regulation, has successfully encouraged innovation to increase cost efficiency, meet new quality standards and reduce financial costs. It has done so at low risk to the consumer. However, there are limits to the extent such a system can replicate the pressure, dynamism and complexity of a market. Companies are subject to periodic comparison on a selected number of variables for an average consumer, who is captive. This, together with the historic incentives for innovation, has tended to see the industry favour low-risk incremental change focused on current requirements, rather than higher-risk breakthrough change to exceed current guidelines and bring greater benefits to customers and the environment. Consequently, there are likely to be productive and dynamic inefficiencies and inappropriate service levels.

4.12 Outsourcing by companies does introduce competition into the supply of services, and this can result in efficiency gains. Many companies make use of external providers to manage elements of their operations, particularly asset based activities, such as construction. Welsh Water outsources all of its operations. However, there are limits to such an approach. Competition is at a company, not a national level, is limited in scope and relies on relatively infrequent decisions by a small number of people. The limits of such an approach are illustrated

2 Ofwat: Setting price limits for 2010-15: Framework and approach, 2008, viewed on 10 March 2009,. <www.ofwat.gov.uk/pricereview/pap_pos_pr09method080327.pdf>

3 Ofwat

by the significant differences in the efficiency with which different companies carry out capital or operating expenditure and the scope for resource optimisation.

4.13 Ofwat has a duty to ensure that efficient companies can finance their functions, and must set a cost of capital accordingly. To the extent that a company can obtain capital at lower cost, it has an incentive to include a higher level of capital expenditure in its regulatory business plan. This could take the form of proposals for capital expenditure to meet perceived quality improvements or new capacity. This leads to a bias towards capital expenditure. For the current price review, Ofwat has added to its existing scrutiny of such expenditure by requiring companies to provide a whole-life cost-benefit analysis for enhancement schemes. Additional capital expenditure to replace poorly performing assets will also reduce operating expenditure and benefit from the operating expenditure efficiency incentive and increase apparent efficiency.

Box 4.A: Bias to capital expenditure

Water companies can meet a supply-demand imbalance through supply-side or demand management measures. In an example cited by Waterwise a number of water companies have considered giving customers water efficient shower heads to reduce water consumption, thereby reducing the need to build additional capacity. This is operating expenditure and a direct cost to the company (whereas the company would receive a return on capital invested in a supply-side solution). However, Ofwat excludes this operating expenditure from its efficiency assessment so the company is not penalised for apparent inefficiency.

4.14 I welcome the more inclusive nature and long-term focus of the present 2009 price review process – in particular the development of 25 year Strategic Direction Statements by the companies together with increased use of cost-benefit analysis to justify proposals. It would appear that these have had a positive impact on the development of the approach to this price review that is allowing an element of innovative thinking to be incorporated into plans.

4.15 The failure of the UK and Welsh Assembly Governments and regulators to give clear, consistent and timely signals to the industry about desired objectives, results in a lack of clarity and certainty and insufficient time for companies to develop and implement innovative solutions has been highlighted to me and is also reflected in the Council for Science and Technology's report.[4] For example, a number of companies have raised the challenge of decreasing water consumption in England in line with the UK Government's vision for 2030. While the UK and Welsh Assembly Governments and the Environment Agency have encouraged companies to reduce consumption, Ofwat has in the past failed to fund projects without a proven positive net present value, thereby limiting progress and discouraging investment in innovative solutions.

Interim report emerging findings

4.16 To address these issues, the interim report recommended further analysis of a range of models of competition on the basis that under the right circumstances such models could deliver benefits to customers and the environment through greater efficiencies. Taking into account the circumstances likely to prevail upon the introduction of upstream competition, the review's provisional view was that an independent procurement entity appeared to offer the best balance between costs and benefits. It could potentially deliver new assets more efficiently and result in some improvement in the use of existing assets while allowing the sector to continue to access capital at favourable rates.

4 Council for Science and Technology: Innovation in the water industry: A Review by the Council for Science and Technology, 2009, viewed on 26 March 2009, <http://www2.cst.gov.uk/cst/reports/files/water.pdf>

4.17 In the meantime, and for those parts of the value chain – such as existing networks – that will remain monopolies – the report argued that the system of economic regulation should do more to encourage innovation, and the right type of innovation. In the case of breakthrough innovations, it may be appropriate for companies to enjoy a greater return or a longer outperformance period, reflecting the need for a higher reward for riskier innovations. It also recognised the potential case for a return on operating expenditure to reduce any bias to capital expenditure.

Responses to interim report

4.18 The interim report asked a range of questions on upstream competition, including whether the Review had correctly identified the main issues, how the decision to extend competition should be taken, how the upstream access price should be determined, the relative merits of an independent procurement entity, the risk of stranding under different models, the impact on the cost of capital under different models and the impact of focussing the regulatory capital value discount.

Identifying the main issues

4.19 In general respondents agreed that the key issues had been identified, however there were differing views on the impact of these issues. Scottish Water Business Stream for example, considered competition to be the best way to promote allocative and dynamic efficiency. This was supported by Severn Trent. However, Northumbrian Water and others were concerned the "fragmentation may lead to a degree of sub-optimallity in the allocation of resources ". They also thought "...environmental and climate change objectives may be more effectively achieved though integrated entities." South West Water commented, "the key issue is whether any efficiency and innovation benefits from upstream competition would be offset by increased transactional costs, loss of operational synergies through overlap provision and service failure costs due to risk of responsibility underlap."

4.20 Ofwat believed that further competition, introduced in the right way, could deliver significant benefits and these would outweigh the costs. However, rather than focus on particular models, Ofwat thought the Review should focus on the changes that would be necessary to deliver benefits and how these could be delivered.

Deciding how to extend competition

4.21 All respondents to this question supported a step-by-step approach based on analysis of the costs and benefits and believed the final decision should be taken by the UK and Welsh Assembly Governments. For example, Northumbrian Water said "we believe all decisions on the extension of competition should be based upon a robust analysis of the likely benefits and costs." United Utilities supported the progressive introduction of competition adding "water companies are guided by three key principles, protecting public health, supply demand balance and protecting the environment. The introduction of competition should not place these principles at risk and in fact should complement these principles.

Determining the upstream access price

4.22 On access pricing, the majority of water companies supported a form of an efficient component pricing rule. Northumbrian Water argued that "while we think that the criticisms of the efficient component pricing rule are valid in relation to retail competition and that wholesale prices should be based upon excluding fully allocated retail costs, we believe that ECPR, properly applied, may still be a reasonable basis for calculating access prices in relation to other elements of the supply chain." Similarly, United Utilities noted "competition will fail where it artificially promotes entry for inefficient entrants. Given the highly geographically-specific nature of

resource, treatment and network costs coupled with regionally-averaged pricing, the scope for economic distortion would be considerable if the retail minus approach were abandoned for common carriage."

The merits of an independent procurement entity

4.23 Whilst there was little support for the current Water Supply Licence model of common carriage, opinion was split over the independent procurement entity (single buyer). United Utilities considered that "the single buyer approach could have advantages over a common carriage option, in that it provides greater certainty to the incumbent network operator." South East water was concerned "that the proposed model of independent procurement entity would split the industry between a legacy sector and a dispersed new sector which would add complexity to the management of resources... the benefits [from the creation of an IPE] could all be achieved with the use of regulated optimisation of regional and national networks." Thames Water believed that "bilateral trading should be encouraged."

What is the risk of stranding under different models?

4.24 In general, respondents believed that the introduction of competition would lead to some stranding. For example, Northumbrian Water argued that "as the Interim Report notes, alternative access pricing rules may lead to the stranding of assets. Although the report suggests that this problem may be limited, to the extent that older assets whose values will be largely written-down are likely to be taken out of service first, this may not necessarily be the case. This proposition assumes a degree of choice over which assets will be retired that may not exist in practice, given the localised nature of many supplies."

4.25 South West Water suggested "to avoid asset stranding the independent procurement entity should allow bids for both fixed and variable costs of supplying new capacity. A mechanism for the fixed costs of stranded assets for all existing capacity would need to be in place and then variable capacity could be used in order of cost of meeting demand requirements – an availability and usage price. The independent procurement entity would have to make availability payments for existing capacity, but the supplier could choose the balance between fixed and variable components within boundaries to find the most efficient balance of sources to be used." However, Severn Trent Water thought "the risk of stranding is likely to be low due to the cost of introducing links to transport water from one area to another, and because increased resource capacity is needed to meet the impact of climate change and environmental pressures on existing abstractions. We would support models which maintain vertical integration of incumbents as it will offer the least risk of stranding."

The impact on the cost of capital under different models

4.26 Many companies were concerned about the impact of separation on the cost of capital and South East Water argued that "even if there are no changes in the short to medium-term, lenders may nevertheless seek additional protections in the terms of new bonds and/or may not be willing to lend for such long tenures." South West Water supported noting "investors are unlikely to see competition as resulting in a lower risk to the incumbent. This therefore inevitably results in a higher cost of capital." Severn Trent Water was not supportive of vertical separation because "vertical separation will remove the inherent economies of scope which are currently exploited in balancing supply between resources, treatment and networks". National Economic Research Associates, which undertook analysis on the financial implications of competition models on behalf of the water companies, concluded that "the financial implications of

competitive reforms could be substantial depending on the competitive model that is adopted, and the approach that is taken to defining the business unit values and on-going regulation.[5]

The impact of focussing the regulatory capital value discount

4.27 The majority of respondents referred to the analysis by National Economic Research Associates on behalf of the water companies which highlighted the disparity between the regulatory capital value and the modern equivalent asset value, making it difficult to consistently apportion the regulatory capital value across the value chain.[6]

Other issues

4.28 With regard to the regulatory framework, respondents agreed that the level of innovation could be increased and that the current framework of economic regulation discouraged investment in riskier, but potentially more valuable, solutions. Severn Trent Water expressed the view that this could be achieved by improving the balance of risk and reward to encourage more innovation, while Thames Water suggested that many innovative ideas are likely to take considerably longer that the five year price review cycle to prove themselves, which makes it unviable for these to be progressed. This view is also supported by the Council for Science and Technology[7] who "urge Ofwat to amend its rules to extend the payback period beyond five years so that companies are allowed to keep the rewards from over a longer period, subject to agreed criteria being met"

4.29 Although it was acknowledged that the bias to capital expenditure could exist, the majority of water companies and Ofwat did not consider it to be significant. Companies' investment plans were based on cost-benefit analysis, scrutinised by reporters and then challenged by Ofwat. However a number of other stakeholders from within the industry disagreed, noting the significant scope for capital building through new development and higher environmental and quality standards.

4.30 In allowing projects to overlap price review periods, respondents believed that Ofwat had gone some way to alleviate the stop-start nature of investment. The Council for Science and Technology said "Ofwat needs to give greater guidance on investment programmes that extend or should extend across review periods, to prevent or limit 'bunching'. However, given the very long-term nature of such investment, companies argued that an 'in principle' commitment over a longer time scale would support more efficient investment. This would need to be reviewed as part of the periodic review process and amended as appropriate.

4.31 With regard to the need for clear and timely signals, many respondents mentioned the potential conflict between the need to improve water and wastewater standards at the same time as reducing energy use. South East Water noted decisions needed to be made in a timely manner and had to take into account company investment cycles to provide adequate time to develop new innovative solutions.

5 National Economic Research Associates: Economic Consulting Financial Implications of Competition Models Water UK, 2009

6 Ibid.

7 Council for Science and Technology Innovation in the water industry: A Review by the Council for Science and Technology, 2009, viewed on 26 March 2009, <http://www2.cst.gov.uk/cst/reports/files/water.pdf>

Box 4.B: Key recommendations by Council for Science & Technology on upstream activities

Recommendation 1: Ofwat should make clear it will be looking to introduce performance assessments to reward water and sewerage companies in terms of improved social and environmental outcomes stemming from adoption of new technological solutions as part of delivering their business plans, by:

- requiring each company to have in place a technology plan as an integral component of their strategic plans for each five-year review process
- rewarding water and sewerage companies when they make the necessary longer-term R&D investments by extending the payback period, subject to agreed criteria being met
- allowing water companies to retain a greater proportion of the net present value of a successful cost-saving innovation

Recommendation 4: Government, through bodies such as the Energy Technologies Institute, needs to encourage development of low carbon technologies applicable to the water sector

Recommendation 6: Government and Ofwat should put in place mechanisms for public engagement and dialogue on:

- water as a scarce resource whose provision entails significant investment and costs
- water supply and treatment has a significant carbon footprint
- future challenges and the role consumers can play in helping to address them levels of investment in water infrastructure

Options for reform

4.32 As detailed above, the aim of reforming the upstream regime would be to increase the efficiency of use of existing assets, ensure new capacity was delivered at lowest cost, better optimise within and across company boundaries and deliver more rapid price, and service and quality improvements over time to deliver water and wastewater services at lowest cost to the environment and customers. Reform would also allow alternative suppliers to develop different ways of tackling the challenges facing the industry and enter the market. These objectives could be achieved in a number of ways. In the following section, I consider the case for reform to the current regime of monopoly regulation, the greater use of market-like instruments and the introduction of further competition. I would stress that these approaches are not mutually exclusive and a final model could adopt elements of each.

Monopoly regulation

4.33 Under this approach, Ofwat would continue to review the framework for economic regulation, and search for ways to improve its impact on innovation in the sector by addressing the risk-reward ratio for innovation, any remaining bias towards capital expenditure, the tendency towards project by project monitoring and the lack of clear signals.

4.34 There are two broad approaches to encouraging further innovation: increased rewards for greater outperformance and targeted support for innovative projects. The capital expenditure incentive scheme provides companies with a proportionate and symmetrical reward for under or outperformance compared to an efficient baseline. However, the current level of rewards, which approximate those available to a frontier company now, are unlikely to encourage frontier

companies to support greater levels of innovation, although the reduced cost of failure will provide companies with additional protection.

4.35 To address this, Ofwat could further develop such an approach. For example, the level of reward for a 20 per cent outperformance could be increased from between six to eight percentage points to at least 10 percentage points. This would increase the reward for exceptional outperformance by around 50 percent. To reduce risk aversion, penalties could remain unchanged. However, care would need to be taken to ensure the incentives for companies to reveal their true expected efficiency gains was not undermined. A similar approach could also be adopted for operating expenditure to encourage comparable behaviour in that area.

4.36 Whilst increasing the rewards available under capital expenditure incentive scheme would increase the overall rate of innovation, there may be specific projects that either wouldn't be financially viable, or would have too high a cost of failure for a company to be willing to implement them. This could include projects that had high start up costs, which required a return period in excess of the current five years or which had a high risk of failure. Such projects could be supported by a system of targeted support, including:

- project-based rewards package relating to the specific cost-benefit analysis and break-even point to ensure that in the event that an innovation is successful, companies will earn a sufficient return to make the project worthwhile;
- project exemptions from penalties to reduce the consequence of failure, particularly where such a lack of success would impact disproportionately on companies' efficiency rankings; and
- reasonable funding of remedial work for failed innovation.

These projects would need to be agreed in advance with Ofwat and it would be for the company concerned to provide the necessary analysis to support such an application.

4.37 Introducing a capital-operating expenditure assumption could tackle the potential bias to capital expenditure. As part of the periodic review process, companies would agree levels of capital and operating expenditure and a capital-operating expenditure ratio. Companies would then be remunerated according to their level of total outperformance according to the ratio, regardless of the actual level of expenditure or operating of capital expenditure. While there may continue to be an incentive to plan for excessive capital expenditure, companies would be indifferent between actual capital and operating expenditure within a periodic review and adopt those solutions that offered the lowest whole-life costs. Given the large range of capital to operating expenditure ratios between companies, and to reduce the risk advantaging or disadvantaging companies on the basis of their particular ratios, these expenditure assumptions would need to be made on a company by company basis.

4.38 As the Commission on Environmental Markets and Performance and more recently the Council For Science and Technology reports have noted, clear and timely signals would give companies the certainty and time they need to support the development and introduction of innovative solutions.[8]

Market-like instruments

4.39 Under a market-like model, the current process of negotiation between incumbents, Ofwat and the Environment Agency over supply of capacity as part of the water resource

8 Ibid. Commission on Environmental Market and Economic Performance, Report, 2007, viewed on 10 March 2009, . <www.defra.gov.uk/environment/business/commission/pdf/cemep-report.pdf >

managements plan and periodic review processes, would be supplemented by a revised regulated access regime for competitors and an efficient purchasing obligation.

4.40 Companies would be given an economic purchasing obligation and, as part of their regulatory requirement, incumbents would have a duty to consider schemes proposed by alternative suppliers. Best value would then be assessed and challenged by a procurement panel with external members. Where it represented best value, the incumbent would be expected to contract with alternative suppliers to provide the appropriate services. Where a company was unable to justify its decision not to use such a supply, Ofwat would fund the requirements of an efficient company.

4.41 An example might be where a neighbouring water company was able to provide a bulk supply (competition between existing assets) or where a new entrant was able to treat and dispose of sludge at a more competitive rate than the local incumbent could develop a new resource. Alternatively, a competitor may be able to provide a significant piece of new infrastructure more competitively (competition for new assets).

4.42 This would require supplementing the current combined supply licence with a new upstream water and wastewater licence and an infrastructure licence. An ex-ante access pricing framework based on full economic costs, with infrastructure assets discounted appropriately (to reflect the capital value discount, and ensure no more than cost recovery), would also replace the current costs principle. Such an approach should ensure that an efficient network operator is able to cover their costs, tariffs are non-discriminatory and cost reflective and support efficient entry. As supplies would be to incumbents, there would be no risk of the de-averaging of prices. Stranding costs could also be considered in determining best value. Incumbents would be obliged to publish indicative long-run marginal prices for the wholesale supply of water and wastewater services at a water resource zone level and transport costs across their region based on a common methodology. A national framework, binding on market participants, would be introduced to reduce the costs of negotiating and agreeing such supplies. Ofwat would have new powers to undertake proactive investigations of compliance.

4.43 Under such a model, the incumbent would remain responsible for all of its current functions except water quality at alternative suppliers' water treatment works, discharge quality at alternative suppliers' wastewater treatment works or the maintenance of alternative infrastructure. It is axiomatic that discrimination should be avoided, however, and this may require consideration of functional separation of the system operator at a later stage.

Box 4.C: Severn Trent proposals for an improved regulatory framework to facilitate competition.

Severn Trent has proposed reforms to the current legislative and regulatory frameworks of the industry to facilitate network interconnection and market integration.[9] The model would be incremental to the current industry structure and require minimal change. Under the model:

- water undertakers would have an obligation to procure water for their customers at the lowest long run marginal cost. This would involve requiring water undertakers to enter into bulk supply agreements, where the cost of procuring water from another undertaker's appointed area was cheaper than the cost of procuring it in an undertaker's own area. By requiring all water undertakers to undertake water resource capital projects at the lowest cost, the model would also help ensure that new resources would be built in the most cost efficient locations and thus at the lowest marginal costs. This would therefore have the effect of optimising water usage nationally and provide the commercial platform for the investment required to support interconnection between different networks;
- there would be a single network code to remove barriers to entry, support bulk supplies and encourage the convergence of standards; and
- to support such trading, there would be a single trading facilitator that would co-ordinate the exchange of information between water undertakers by operating a "bulletin board." Such a facilitator would support bulk water supply trading between different companies, would require minimal changes to the current decision making framework and would be cost-efficient.

Further competition

4.44 There are two broad approaches to introducing further competition upstream. One option is a competition for the market model where companies compete periodically for the contract to provide water and wastewater services. The other approach is a competition in the market model where companies compete on an ongoing basis to provide such services to individual customers. The first of these approaches approximates to the independent procurement entity discussed in the interim report, whilst the second includes the gross mandatory pool and bilateral market.

For the market model

4.45 Under a competition for the market model, the current highly regulated process of determining supply of capacity would be:

- replaced by contracting for all capacity; or
- supplemented by contracting for new or replacement capacity. Existing capacity would continue to be regulated as now by Ofwat.

This could either be for the whole market, or a subset such as non-household customers.

4.46 An independent contracting agency would look to procure water and wastewater services and infrastructure at lowest long-term expected cost. It would do this by entering into long-

9 Severn Trent WAter

term contracts with the local incumbent, neighbouring incumbents and alternative suppliers to provide demand management solutions or capacity and network infrastructure and contracts of a potentially varying range of durations for volume of abstraction, water and wastewater treatment, discharge and sludge treatment and disposal.

4.47 An example might be where population growth created a supply-demand imbalance for water. The contracting entity would invite tenders and market participants would put forward supply or demand side options for consideration. The contracting entity would then contract with the lowest expected cost provider for provision of capacity and volumes over an appropriate time period. The UK and Welsh Assembly Governments or the regulator could also task the entity with other objectives, such as supporting innovation or increasing security of supply.

4.48 To achieve this, the current system of water supply licences could be replaced by a new system of licences to provide water and wastewater services. In time, such licences could also be adopted by appointees. Three upstream licences would potentially be available:

- supply services (abstraction and water treatment; wastewater treatment and discharge and sludge treatment and disposal);
- infrastructure services; and
- network operator services.

4.49 An ex-ante access pricing framework based on full economic costs, as determined by Ofwat, would replace the current costs principle in the case of supply to the independent contractor (not a customer or retailer). Such a framework should ensure that:

- the network operator is able to cover their costs;
- tariffs are non-discriminatory and cost reflective; and
- efficient entry is supported.

This could be achieved through an ex-ante access pricing framework based on long-run avoidable costs, with infrastructure assets discounted appropriately, for example. Such an approach would be akin to the pricing principle for wholesale water supplies to retailers, as proposed in the Review's interim report, and would allow alternative suppliers to make a fair return. As alternative suppliers would contract with the local incumbent, there would be no risk of de-averaging of prices. Incumbents stranding costs could also be taken into account in determining best value.

4.50 The network operator would be obliged to publish indicative marginal prices for the supply of water and wastewater services at a water resource zone level and transport costs across their region based on a common methodology. Such an approach would also require the introduction of appropriate codes and standards for each licence, while a national framework, binding on market participants, would be introduced to reduce the costs of negotiating and agreeing such supplies.

4.51 Under this model, the independent contracting entity would become responsible for water resource management and drought planning, as companies would no longer have defined service areas. All parties would have a duty to ensure the wholesomeness of water, both for that part of the supply chain that they were responsible for, and for ensuring robust mechanisms were in place to ensure the quality of any inputs. The incumbent, as network operator, would retain many of its existing functions including:

- water quality through the network;
- maintenance scheduling;

- emergency response management, including ensuring the supply of water and wastewater services; and
- short and medium-term optimisation on the basis of given supply prices.

Infrastructure providers would be responsible for the physical integrity of their network and actual maintenance.

4.52 In the first instance, I would propose that the incumbent could remain integrated, although it is axiomatic that discrimination should be avoided and this may require functional or potentially legal separation in due course.

Box 4.D: South-east Queensland water grid manager.

The Queensland Government has recently reformed the regulatory framework for urban water markets in south-east Queensland. The south-east Queensland Water Grid Manager has been established and acts as the sole purchaser and seller of bulk water services in the region.[10] Water services are supplied to the water grid manager by the Bulk Water Supply Authority as the owner of bulk water sources, the Manufactured Water Authority as the owner of bulk manufactured water supplies and the Bulk Water Transport Authority as the owner of the water transport services. The water grid manager seeks both to minimise future capital expenditure for new investment, and to optimise the use of existing resources to meet demand. The grid manager then sells water supplies to retailer businesses in the south-east Queensland region. These local-government-owned retailers are responsible for the retail sale of water supply and sewerage disposal services to households and businesses through their water distribution networks.

In the market model

4.53 Under a competition in the market model the current process of negotiation between incumbents and Ofwat over supply of capacity would either be:

- replaced by centralised trading arrangements between suppliers and retailers through an active central market agency such as a pool; or
- replaced by bilateral negotiations between suppliers and retailers, with a passive central market agency.

This could either be for the whole market, or for a subset, such as non-household customers.

4.54 With a gross centralised model, wholesalers would bid to provide services (for example treated water). These bids would then form the basis of a marginal price set for a defined market. Suppliers and retailers would sell into and purchase from, the central market at common, marginal prices. Participants would be free to sign contracts for difference (where parties agree to offset any difference in actual and contract prices) to manage the risks associated with the marginal pricing regime at prices that they agreed bilaterally. The system operator would manage physical delivery.

4.55 With a bilateral model, retailers would negotiate for physical delivery with suppliers directly. Suppliers and retailers would pay network charges. The system operator would be responsible for managing physical delivery. Such approaches could involve a mixture of short and long-term contracts for volume and capacity. Non-contestable activities could be franchised

10 South-East Queensland Water Grid Manager, viewed on 10 March 2009, <http://www.seqwgm.qld.gov.au>

through the system or network operator. A more limited version of bilateral trading might be a reformed common carriage framework where a limited number of parties transacted with each other across a common network based on cost reflective network charging principles.

4.56 An example might be where a water supply zone has a number of potential suppliers who are able to compete with each other to provide demand, such as the London or Manchester ring mains. Retailers would then meet demand either by contracting directly with suppliers or use a central mechanism to determine supply at lowest cost.

4.57 As with the contracting model, to achieve this, the current system of water supply licences could be replaced by a new system of licences to provide water and wastewater services. In time, such licences could also be adopted by appointees. Three licences would be available:

- upstream services (abstraction and water treatment; wastewater treatment and discharge and sludge treatment and disposal);
- infrastructure services; and
- network operator services.

4.58 Such an approach would also require the introduction of national codes and standards for each licence. As upstream suppliers would contract direct with retailers or potentially large customers, the access price would need to take account of potential stranding costs and retail pricing objectives.

4.59 Under this model, individual suppliers would become responsible for the quality of treated water or discharges leaving their works. The incumbent, as network operator, would retain many of its existing functions including:

- water resource management and drought planning as companies would no longer have a defined area to serve;
- water quality through the network;
- maintenance scheduling;
- emergency response management, including ensuring the supply of water and wastewater services; and
- short-term optimisation.

Infrastructure providers would be responsible for the physical integrity of the network and actual maintenance.

4.60 Given the much greater importance of the network operator, in the first instance, I would propose that the incumbent could remain legally integrated, but that the network operator should be functionally separated. Legal separation may be required in due course.

4.61 A limited version of a bilateral market might be a reformed combined water supply licensing framework. Here, the incumbent would continue to be regulated by Ofwat, as now, and would retain the role of network operator. The new entrant would be responsible for water or discharge quality leaving their works. Such an approach would also require the access pricing framework above and given the scope for discrimination, sufficient powers to enable Ofwat to investigate non-compliance.

Costs and benefits

Benefits

4.62 I would expect these models to deliver benefits compared to the status quo in three broad areas:

- ensuring production by existing assets, and construction and production of new and replacement assets at lowest economic and environmental cost through the spread of best practice;
- optimising the use of new and existing assets; and
- increasing the growth rate of efficiency, quality or service level over time through greater innovation.

4.63 The impact of different upstream market models on economic and environmental outcomes are described below and summarised in table 4.A.

4.64 A competition for the market approach would lead to improved optimisation within and across existing company boundaries as suppliers would have an interest in selling services at the highest price and the network operator would have a strong incentive to reduce costs by minimising the cost of supply. Both of these would lead to a reduction in the need for new capacity. Pressure to increase efficiency, service or quality of existing assets over time would be limited although short-term contracts for supply volumes would encourage on-going efficiency. Gains could be greater under a whole-market rather than incremental framework.

4.65 There could be a significant improvement in the efficiency of new and replacement capacity as alternative suppliers competed for business. With supply and demand decisions taken by an independent organisation, scope for discrimination would be limited. However, practical experience with such an organisation had demonstrated a number of potential problems such as lack of transparency and accountability, scope for further competition, gold plating and misaligned incentives which would need to be addressed through appropriate transparency, regulation and incentives.[11] Such an organisation would also be able to support other non-economic objectives from the UK and Welsh Assembly Governments or regulators including security of supply, innovation or water efficiency. A market based approach could also reduce Ofwat's information requirements from companies, reducing the overall impact of regulation on companies.

4.66 A competition in the market approach would lead to optimisation within and across existing company boundaries as suppliers would have an interest in selling services at the highest price and buyers would have a strong incentive to reduce costs by minimising the cost of supply. Both of these would lead to a reduction in the need for new capacity. There would be on-going pressure to increase efficiency, service or quality over time as companies sought to secure market share. There would be strong competitive pressures to improve the efficiency of new and replacement capacity as alternative suppliers competed for business. There may be reduced scope for such arrangements to support the achievement of non-economic objectives. A market based approach could also reduce Ofwat's information requirements from companies, reducing the overall impact of regulation on companies. In the case of a reformed common carriage framework, the scope for entry may be more limited.

11 World Bank: Centralised Purchasing Arrangements: International Practices and Lessons Learned on Variations to the Single Buyer Model. 2006, viewed on 10 March 2009, <http://siteresources.worldbank.org/INTENERGY/Resources/CentralizedPruchasing.pdf>

4.67 A market-like approach would lead to better optimisation across boundaries as companies and alternative suppliers would be able to exploit arbitrage opportunities. Companies would also have an increased incentive to optimise within their boundaries to reduce the scope for substitution by alternative providers. Both of these would lead to a reduction in the need for new capacity. Pressure to increase efficiency, service or quality over time would be limited and, as now, driven primarily by regulation. There would also be an improvement in the efficiency of new and replacement capacity as alternative suppliers competed for business. However, to the extent that incumbents would continue to have an informational advantage and would continue to have an important role in the regulatory process, there would still be scope for significant price and non-price discrimination, as witnessed in other utility markets.

4.68 A reformed regulatory regime would increase the incentive for companies to develop and introduce more innovative ways of abstracting, treating, distributing and discharging water. This would lead to some improvement in efficiency of new and replacement capacity over time.

4.69 While it is necessarily difficult to estimate the value of such changes, the following section provides some illustration of the scale of potential benefits. Further details are given in annex A.

4.70 On the basis that reform led to increased pressure for cost minimisation of existing assets, halving the variation in operating and capital maintenance expenditure efficiency between companies would deliver savings of £4 billion over the next 30 years, while eliminating it would reduce costs by £8 billion. To the extent that the industry as a whole was not operating at the production possibility frontier, there would be scope for additional savings as in other industries. With regard to new build assets, halving and eliminating the variation in capital expenditure efficiency between companies would deliver savings of £2.5 billion and £5 billion respectively. While it is very difficult to assess what the potential savings from alternative providers might be, for illustrative purposes, if 10 per cent of projects could be delivered at a 10 per cent saving costs would fall by a further £200 million over the next 30 years.

4.71 With regards to optimisation, an Environment Agency study based on companies draft water resource management plans concluded that the better use of resources could realise potential savings of a discounted £260 million over the planning period to 2035. This would come from an increased use of existing resources and around a 20 per cent reduction in the need for new resources. Such an assessment is based on the particular configuration of the current system and future options that the Environment Agency has explored. There may be opportunities to achieve greater gains considering a fuller set of options, particularly the conjunctive use of resources. These could increase the yield from existing resources, perhaps to five or 10 per cent. In the case of the south-east Queensland Water Grid, the grid manager realised a 14 per cent increase in yield through greater connectivity and the optimisation of resources.[12]

4.72 Finally, greater rivalry between suppliers may, as in other industries, also lead to an increase in the rate of on-going efficiencies. If it were to increase by 0.5 percentage points this would lead to a fall in costs of £450 million over the next 30 years for new assets.

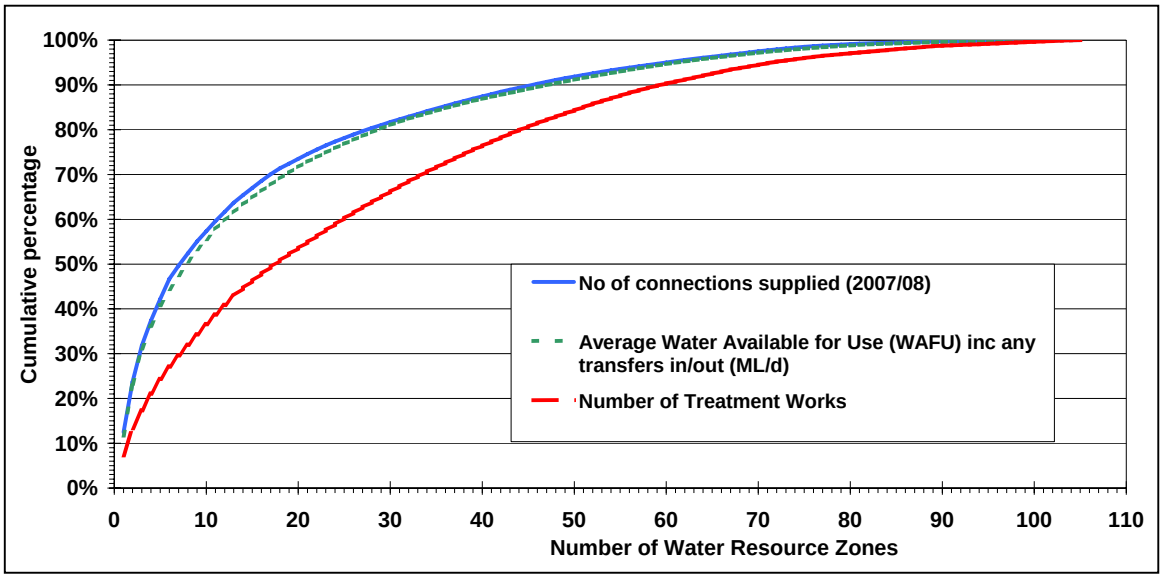
4.73 While not monetised, service levels may rise as upstream suppliers (and retailers) more effectively represent their interests with the network and network operator. This could take the form of better maintenance scheduling, improved network optimisation and better emergency response.

4.74 However, the impact on customers and the environment not only depends on a model's ability to generate benefits, but also on its applicability in different markets, along the value chain and to assets of different ages.

12 South-East Queensland Water Grid Manager, viewed on 10 March 2009, <http://www.seqwgm.qld.gov.au>

4.75 The for the market, market-like and regulatory models are widely applicable both along the value chain and across markets, as they do not require on-going competition between suppliers to be effective. An in the market model would be restricted to markets with scope for more than one supplier. Chart 4.A shows that a majority of customers are concentrated in a small number of zones often with more than one supply: 57 per cent are in the top 10 zones, 74 per cent in the top 20 zones and 81 per cent in the top 30 zones. Many of these zones are contiguous and have significantly varying marginal costs of supply. Therefore over time it is likely there will be more transfers between zones, increased integration and hence greater geographical scope for competition. Recently, United Utilities and Yorkshire Water have integrated the zones within their areas so that 95 to 97 per cent of customers are in a single zone, suggesting this kind of integration may be economic except for small, isolated areas. However, there may still exist significant practical constraints to sharing resources within such zones. Given the nature of wastewater treatment and systems, the scope for such competition in wastewater markets will be more limited.

Chart 4.A: Cumulative share of supply by water resource zone



4.76 In the case of market mechanisms, the scope for competition between new and existing assets depends on equivalent pricing between such assets. 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;[13] 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

13 Submission to Cave Review by United Utilities

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.

As competition further develops, appropriate methods of cost allocation will have to be found in order to ensure that competition between incumbents and entrants takes place on fair terms.

Table 4.A: Relative impact on economic and environmental outcomes and service standards from different upstream models (models on horizontal axis, factors on vertical axis)

Model/ Impact on outcomes	For the market	In the market	Market-like	Regulatory
Minimise production cost existing assets	Low	Medium where choice, otherwise low	Low	Low
Minimise construction and production costs new assets	High	High	Low/ medium	Low
Optimise use of existing assets	Low/ medium	High	Low	Low
Optimise construction and use of new assets	Medium/ high	High	Low/ medium	Low
Growth rate efficiency, service and quality levels	Low/ medium	High where choice, otherwise medium	Low	Low
Functional applicability	High	Low	High	High
Value chain applicability	High	Medium	High	High
Asset type applicability	Variable	All	New	All

Source: Review

4.77 This analysis suggests that, all other things being equal, the regulatory model will have least impact on outcomes. The market-like, for the market models and in the market models will have greater impacts on economic and environmental outcomes and service and quality standards. However, the applicability of these models varies, with a competition in the market approach only currently viable in certain parts of the country and for certain elements of the upstream value chain.

Costs

4.78 Introducing and supporting these models will also have costs compared to the status quo. These can be divided into four areas:

- framework set up and maintenance costs;
- impact on efficiency of scale and scope;
- financing costs; and
- regulatory costs.

4.79 The impact of different upstream market models on economic and environmental outcomes are described below and summarised in table 4.B.

4.80 The competition for the market approach would require significant changes to the regulatory framework to support greater competition. There would be no change to efficiencies of scale and scope as alternative providers would only be able to supply services where they did so at lower cost than incumbents. The impact on existing and on-going financing costs would depend on the extent of, and investors' reactions to, proposed changes in the licensing regime, and their perception of exposure of their returns to new risks. The latter may be limited as contracting would give investors significant levels of security about their returns especially if contracting was restricted to incremental investment in new assets and existing assets continued to be regulated under the existing regime. Depending on the model, there may be a limited reduction in regulatory costs as Ofwat would continue to need to regulate non-contracted supply.

4.81 The competition in the market approach would require significant changes to the regulatory framework to support competition. There could be changes to efficiencies of scale and scope if incumbents were forced to divest in order to support a competitive market. The impact on financing costs could be significant as, depending on market design, the in the market framework may expose investors to significant short and long-term risks. There would be little impact on regulatory costs in the short run as Ofwat would continue to need to regulate the industry until competition was fully established. When this was achieved, there could be a significant reduction in regulatory oversight. In the case of narrower combined water supply licensing model, there would be very little change to the regulatory framework. The impact on current financing costs would depend on the structural changes, including licence changes envisaged. The impact on the on-going cost of capital would depend on the scope of potential competition and the risk of stranding to incumbents. A focus on new resources would have only a limited impact.

4.82 A market-like approach would require little change to the current framework except for additional internal and external scrutiny. There would be no change to overall administrative costs or efficiencies of scale and scope as alternative providers would only be able to supply services where they did so at lower cost. The impact on financing costs should be negligible as undertakers will continue to be the monopoly providers of upstream water and wastewater services as now. There would be no other impact on regulatory costs.

4.83 While it is necessarily difficult to estimate the monetary value of such impacts, the following section provides some illustration of the scale of potential costs. Further details are given in annex A.

4.84 Creating and maintaining the competitive frameworks for each of the models above will have costs for incumbents and the regulator. Discussions suggest that additional oversight could cost as little as a few hundred thousand pounds a year. The preparation and maintenance costs of a competitive framework will be driven by the specific nature of the market design. Experience of some initial market designs, notably the south-east Queensland water grid manager (a contracting entity) and the Irish electricity market (a bilateral market which ceased in 2007 when the Single Electricity Market commenced operation) demonstrate that simpler forms of commercial arrangements can be developed for sums in the region of £10 million and operated for less than £5 million a year. While such figures need to be treated with some caution, it does appear that the cost of developing and running trading arrangements that are relatively simple in form are unlikely to be prohibitive.

4.85 Incumbents may also incur additional costs through the replication of functions and through transaction costs. After discussions with stakeholders, contracting costs are likely to be small at around one per cent of total costs.

4.86 In the case of vertical separation, there may be impacts on economies of scale and scope. Analysis has found evidence of economies of scale for smaller companies, constant returns for an average sized companies and diseconomies of scale for larger companies, though the latter effects are small.[14] The study also found positive economies of scope from integration of water and wastewater production activities where there were shared inputs, diseconomies where sharing of inputs was limited and no evidence that combining vertically integrated water and wastewater yields economies of scope.

4.87 Work by consultants on behalf of water companies and Ofwat suggests that different models will have varied impacts on the costs of capital in both the short and long-term.[15] Any such impacts would be in addition to the effect of current conditions in financial markets on the ability of companies to finance their operations under the status quo.

4.88 This could be through transitional impacts, where changes to the industry may breach existing debt covenants. While covenants vary over time, by type of debt and from company to company, the industry can be broken down into two broad groups. Companies with debt levels of around 65 per cent of regulatory capital value ("equity model") and those with higher levels of up to 90 per cent ("geared" model). Equity companies are likely to have less onerous covenants which are primarily focused on retaining the creditworthiness of the company. If a restructuring event such as a change to the rights, benefits or obligations of the undertaker or changes to the licence have a material impact, investors have the right to repayment.

4.89 To support their higher debt levels, geared companies have given debt providers a range of additional protections. These financial and non-financial covenants are designed to closely define the parameters of financial and business risk that investors are exposed to. The covenants generally incorporate a materiality test. Some of these may be triggered even without there being a material decrease in creditworthiness. In the "geared model" covenants are also structured to include early warning provisions (or "trigger events") designed to coordinate efforts to prevent default. Where a default does occurs, there is generally a standstill period of 18 months during which creditors do not take enforcement action and the company undertakes further action to prevent the company entering special administration. At the end of the period investors could enforce repayment, although this would trigger special administration which could in turn result in investors failing to recover the open market value of their investment.

4.90 Whether covenants are breached is ultimately a legal question. However, on the basis of discussions to date, I believe that the regulatory model would be unlikely to breach covenants. An incremental for the market model could do so, but this would only be likely if there was disaggregation and changes to licence conditions. Broader competition for the market or in the market models for all capacity would very likely do so. Such an assessment is supported by the analysis for the water companies and Ofwat.

4.91 Companies will naturally seek to avoid breaching covenants and would therefore likely seek the consent of creditors to particular proposals. As the consultants to the water companies and Ofwat note, costs will therefore depend on the outcome of negotiations. If the regulatory or incremental for-market model were to breach covenants, I believe that the materiality impact is unlikely to be significant and the transitional and ongoing financing impacts are therefore likely to be limited. In the case of competition for all capacity, depending on how such competition

14 ACIL Tasman: Size and scope economies in water and wastewater services: an investigation into economies of size and scope associated with alternative structures for the Water Corporation's activities, 2007, pp11-36, viewed on 10 March 2009, <http://www.era.wa.gov.au/cproot/6227/2/ACIL%20Tasman%20-%20Size%20and%20Scope%20Economies%20in%20Water%20and%20Wastewater%20Services.pdf> Stone and Webster: Investigation into evidence for economies of scale in the water and sewerage industry in England and Wales, 2004, viewed on 10 March 2009 <http://www.ofwat.gov.uk/legacy/aptrix/ofwat/publish.nsf/AttachmentsByTitle/stone_webster_150104.pdf/$FILE/stone_webster_150104.pdf>

15 National Economic Research Associates: Financial Implication of Competition Models Water UK, 2009. and R Nourse: Competition proposals and financing issues: a report for Ofwat, 2009, viewed on 10 March 2009, <http://www.ofwat.gov.uk/competition/review/rpt_com_nourse260209.pdf>

was introduced, the materiality impact could be much greater as would be the impact on the financing costs. While I do not believe that, in general, investors would seek full repayment, for illustrative purposes analysis on behalf of the water companies suggests that if all outstanding bonds were repaid at on one conventional basis (so called Spens prices) this could cost around £7 billion. If they were repaid at par this could cost around £2 billion. An alternative would be for investors to demand an increase in the yield. This could be of the order of 12.5 to 50 basis points for a change that was not perceived to adversely affect risk. Investors could also be provided with comfort, but this would need to be credible and could reduce the potential benefits of competition.

4.92 The actual amount would depend critically on prevailing circumstances and the nature of the reforms including the proportion of revenues at risk, the degree of risk to these revenues and any change in the return provided by the system of regulation. Ofwat could influence these parameters but with a potential reduction in the positive impact of competition on efficiencies. A step-by-step approach to change over time could also reduce any potential impacts. Where costs arise because companies have retained less flexibility to accommodate proportionate change these companies cannot assume that the cost of renegotiation should be met by customers. As Ofwat notes "the presence of such protections or covenants on some companies' debt – whose effect is to provide an impediment to any regulatory change – cannot be a reason to fossilise the regulatory system. To act otherwise could provide a perverse incentive for companies to block future regulatory change and flexibility."[16]

4.93 The on-going cost of financing could also be adversely affected as investors would expect a higher cost of capital to compensate them for the increased risk of operating in a competitive environment and companies reduce their level of gearing to maintain credit ratings. These impacts would be more pronounced where a focused approach to the allocation of the regulatory capital value between business units was adopted or the whole regulatory capital base was at risk. Illustrative analysis for the water companies based on analysis of the energy sector suggests a competition for the market model could increase the cost of capital by 100 basis points and a competition in the market model by 400 basis points. Depending on whether the discount in the regulatory capital value is focused or not, they suggest gearing levels may also have to fall to 70 per cent and 50 per cent respectively.

4.94 As the consultants for the water companies recognise, evidence available to illuminate this issue is limited and is very specific to the regulatory and legal framework in place. Other sources, reflecting different competitive models and frameworks, suggest that the increases in the cost of capital and on gearing levels could be lower.[17]

4.95 The competitive models proposed here for the water sector differ from those examined by the water companies' consultants, in some important respects, in particular regarding the scope of market opening and the extent of the value chain exposed to competition, and the potential additional range of protections (for instance against stranding) that might be applied relative to the electricity models examined. For instance:

- the potential protection afforded by any new regulatory framework with regard to the impact of competition on existing plant, the risk of stranding and returns;
- by retaining the integrated nature of the incumbents, the impact of ownership separation on income risk would not be relevant;

16 Ofwat: Introduction to competition issues and financing proposals a report for Ofwat, 2009<http://www.ofwat.gov.uk/competition/review/rpt_com_noursecover.pdf>

17 Single Electricity Market Committee: Fixed Cost of a Best New Entrant Peaking Plant for the Calendar Year 2009, 2008. Section five. www.allislandproject.org/en/capacity-payments-consultation.aspx?article=c992e67e-9ab7-4150-9729-de5edc8deb2c and Economic Regulation Authority (Decision on the Maximum Reserve Price Capacity Price Proposal 2011/12. Page 9. 2009. www.era.wa.gov.au/cproot/7283/2/20090120%20D200900408%20Decision%20on%20the%20Maximum%20Reserve%20Capacity%20Price%20Proposal%20for%202011-12.pdf

- the possibility that greater use of long-term contracts for at least some merchant plant supply could materialise, thereby potentially reducing the impact on the level of gearing and income risk;
- the ability to pass on costs in a competitive market; and
- the significant first mover advantage in relatively smaller water markets might suggest a lower risk of stranding (although incumbents pricing strategies may be constrained by a need to avoid charges of predation under Competition law).

These factors could reduce the estimated impacts on financing costs, potentially significantly.

Box 4.E: The cost of capital

The capital asset pricing model is commonly used in determining the weighted average cost of capital in regulated industries. The cost of capital depends on the cost of debt and the cost of equity and the level of gearing. In the case of the models of competition proposed by the review, discussions with investors have been inconclusive regarding the perceived risk of long-term contracted plant relative to regulated plant, with a credit rating of A- and similar gearing levels. Merchant plant is likely to have a rating of BBB+ and lower gearing levels. Spreads between such debt have risen from an average of less than 20 basis points over the last 10 years to a peak of over 200 basis points recently.[18]

The cost of equity depends on the risk free rate, the equity risk premium, the asset beta and the level of gearing. In the 2004 price review, Ofwat adopted an implied asset beta of 0.45 on an equity beta of one and gearing of 55 per cent. For contracted plant, discussions with stakeholders suggest that the beta would be below 0.6 and for merchant plant with contracts less than 0.8. The actual beta would depend on the legal, regulatory and market frameworks in place. Gearing levels for these competitive elements of the value chaincould be 50 and 70 per cent, but would depend on market conditions.

On this basis, at the current time, the weighted average cost of capital for contracted plant would be around 80 basis points more expensive than the 5.1 per cent post tax figure assumed by Ofwat in the 2004 periodic review and the cost of capital for merchant plant would be around 240 basis points more expensive. Assuming the average debt premium over the last 10 years and less conservative asset betas, the weighted average cost of capital could be higher by 30 basis points and 80 basis points respectively. There are a number of asymmetric risks from competition not considered by the capital asset pricing model which could also impact on the cost of capital.[19]

4.96 The actual cost will depend critically on the prevailing circumstances in the financial markets at the time such changes might take effect. In the Pre-Budget Report, the Government forecast that credit markets were likely to ease in 2010, with the three month sterling interbank rate stabilising around 20 basis points higher than forecast at Budget 2008.[20] This would be before any of the scenarios above would take effect. However, I recognise that alternative scenarios are also possible.

18 National Economic Research Associates: Cost of Capital for PR09: final report for Water UK, 2008 Section p57 Table 7.2. p58 Table 7.3 <http://www.water.org.uk/home/news/press-releases/cost-of-capital-for-pr09/080623-nera-water-uk-wacc-report-final.pdf> and National Economic Research Associate presentation What is the appropriate cost of capital in the current climate? To the ninth Water UK annual city conference

19 National Economic Research Associates :Cost of Capital for PR09: final report for Water UK, 2008 Section p126 section A.3 <http://www.water.org.uk/home/news/press-releases/cost-of-capital-for-pr09/080623-nera-water-uk-wacc-report-final.pdf>

20 HM Treasury: Pre-Budget Report 2008: Facing global challenges: supporting people through difficult times, 2008. Chart A3 Page 160. <http://www.hm-treasury.gov.uk/d/pbr08_annexa_339.pdf>

4.97 Increased regulatory costs of up to £3 million a year for Ofwat and the Drinking Water Inspectorate, equivalent to a 10 per cent increase, appear plausible.

Table 4.B: Relative impact on framework, efficiency and financing costs of different upstream market models (models on horizontal axis, factors on vertical axis)

Impact on outcomes	For the market	In the market	Market-like	Regulatory
Framework set up costs	Medium	Medium	Low	N/A
Framework on-going costs	Medium	High	Low	N/A
Impact on efficiencies of scale and scope	Low	High where divestment	Low	N/A
Transitional financing costs	Medium	High	Low	N/A
Long-term financing costs	Low/ medium	Potentially high where choice, otherwise medium	Low	N/A
Regulatory costs	Low	Medium	Low	Low

Source: Review

4.98 This analysis suggests that, all other things being equal, regulatory or market-like market models, then competition for the market models and then in the market models will have the greatest impact on framework, efficiency, financing and regulatory costs.

Other outcomes

4.99 Discussions with stakeholders have also identified a number of other issues which need to be considered, including:

- public health, where the Drinking Water Inspectorate already has a robust framework for ensuring the wholesomeness of water but it is important that the Inspectorate has the resources and powers needed to maintain this framework if and when competition is extended;
- security of supply, where under all scenarios, the industry will continue to draw up water resource management plans and drought plans to ensure sufficient water availability;
- prices, where the regulator will continue to set a cap on prices until markets are fully competitive. The models are also compatible with cross subsidies where these are considered appropriate.
- mixing water, where companies already mix water and previous analysis has demonstrated the capacity for new suppliers to do so.[21] With further competition it is important that any mixing safeguards the biological, physical and chemical characteristics of the water supply and is consistent with physical process of transporting water;[22]

21 Water Research Centre : Common Carriage: Hydraulic, Network and Quality Issues, 1996.

22 Drinking Water Inspectorate: Guidance on the Water Quality Aspects of Common Carriage, 2004 <http:// www.dwi.gov.uk/regs/infolett/2004/info1304guidance.pdf>

- optimisation, where the industry has developed a protocol for optimising the network with multiple suppliers, Hydraulic Management of Network Input (HyMoNI);
- sewage equivalence, where previous analysis has demonstrated that companies could estimate equivalence and provide offsetting payments as appropriate; [23]
- company failure, where the UK Government is currently considering further reforms to the special administration regime to ensure that customers will continue to be supplied in the event of the failure of a water or sewerage company;[24] and
- planning for and responding to emergencies, where in the case of vertical disintegration to enable competition, it will be important to have a mechanism whereby the system operator could suspend market arrangements and ensure on-going delivery of water and wastewater services.

Summary

4.100 The analysis above and the cost benefit in annex A finds that whether reform will deliver net monetary benefits depends largely on any change in efficiency and the cost of capital. The initial cost-benefit analysis suggests the stylised models described above could deliver the following monetised net benefits. These are set against a net present cost of delivering water and wastewater services of around £160 billion over 30 years. The additional costs of de-gearing by highly geared companies could be of the order of £4 billion. Other models, introduced in different ways are also possible.

Table 4.C: Discounted net present value of alternative scenarios over 30 years (£ billion)

Model/NPV £ billion	High	Medium	Low
Market-like	1.3	1.3	1.3
For the market (incremental)	2.8	4.2	5.3
For the market (broad)	-1.9	1.1	3.4
In the market (WSL)	-0.1	0.4	1.0
In the market (broad)	-23.0	-12.2	-1.5

Source: Review calculations

4.101 In addition I would expect them to deliver a range of non-monetised benefits including more choice, improved service levels, higher quality outputs and environmental benefits.

Evaluation

4.102 On the basis of the evidence above, I believe that there are potential benefits from reform to the current frameworks. Given the very different circumstances prevalent across England and Wales, however, no one approach, or combination of approaches, will be optimal across the country. Different approaches will be appropriate in different regions at different times. It is therefore important that the UK and Welsh Assembly Governments, industry and the regulator

23 Water Research Centre submission to call for evidence. Marsden Jacob Associates: Potential to Promote Competition in Sewerage Markets, 2004.
<http://www.ncc.gov.au/pdf/Marsden_Jacob_Associates.pdf>

24 Department of Environment, Food and Rural Affairs: Consultation on the Rules of Court for the water and sewerage special administration regime. London, 2008.
<http://www.defra.gov.uk/corporate/consult/water-admin/index.htm>

have the flexibility to adopt the model that best serves customers and the environment for a given time and place.

4.103 At the same time, I also recognise that the costs and benefits of the different models vary - some have few costs and limited benefits and others require fundamental change with the prospect of significant costs, but also greater benefits. To the extent that these models are cumulative, the need for further reform also depends on the effectiveness of previous measures. The lack of international experience of some of these models, particularly the competition in the market models, also means these estimates are necessarily uncertain.

4.104 It is therefore right to be cautious, starting where the risk-return ratio is most favourable and most certain, particularly given the uncertainty around the current economic and financial circumstances. In the first instance, I would therefore support supplementing the current common carriage framework with a market-like framework based on an economic purchasing obligation. Under such an obligation, companies would have a duty to procure the best value services . This would support Ofwat's primary duty to further the consumer objective by "promoting effective competition between persons engaged in, or in commercial activities connected with, the provision of water and sewerage services."[25] By looking outside current company boundaries such an approach would go beyond the efficiencies currently achieved by outsourcing.

4.105 I am also concerned that, as discussed in the interim report, the current interpretation of the costs principle effectively eliminates competition and market entry through the water supply licensing regime, to the detriment of consumers. By preventing potentially competitive long-term entry and protecting the incumbent from competition, such an approach represents an unnecessary and significant barrier to entry. As a result eligible non-household customers are unable to choose alternative sources of upstream supply, reducing pressure on incumbents to improve their offer. At the same time, it is important that any such entry is efficient in the long-run. An ex-ante access pricing framework based on forward looking long-run avoidable costs, determined by Ofwat at a water resource zone level would, address these issues for supplies to retailers and large customers. Further protection would be provided by Ofwat's duties to further the consumer objective and ensure that companies are able to finance their functions. To address the risk of discrimination, Ofwat would need sufficient powers to investigate non-compliance.

4.106 Such changes are potentially applicable across the country and would result in an appreciable and growing improvement in outcomes at very little cost and without risk to existing investment. Such an approach would have a net present value of around £1.2 and £2.3 billion over the next 30 years as companies increased the efficiency with which they procured new assets. As importantly, the experience of such a change could then inform any decision by the UK and Welsh Assembly Governments and the UK Parliament and the National Assembly for Wales to extend competition further.

4.107 At the current time, I believe this is most likely to be through the introduction of an incremental contracting entity to buy water and wastewater services from suppliers and sell them on to retailers. By looking across company boundaries and across suppliers, such an entity could realise significant savings over and above those from regulation or outsourcing.
This would come from the better use of existing resources and, over time, reduced need for new resources and the more efficient construction, maintenance and operation of assets. Depending on how such competition was introduced, this could more than offset the increase in the cost of capital required to support a more competitive market environment.

25 HM Government: Water Act. Section 2A of the Water Industry Act 1991 as inserted by section 39 of the Water Act, 2003
<http://www.opsi.gov.uk/acts/acts2003/pdf/ukpga_20030037_en.pdf>

4.108 Given the current financial situation and its impact on the scope for, and cost of borrowing, it is unusually difficult to estimate the net present value of such reform, reinforcing the value of a step-by-step approach. Under an high scenario it could be of the order of £2.8 billion, under a medium scenario it could be £4.2 billion and under a low scenario it could be £5.3 billion over 30 years. It would also be well placed to ensure sufficient security of supply and achieve other, non-economic objectives. It could also allow Ofwat to reduce its information requirements.

4.109 While there is scope for introducing broader in the market competition in certain parts of the country, the cost- benefit ratio is more uncertain and, depending on the way such competition is introduced, there is a risk of significantly higher costs. These would take the form of transitional financing costs and an increased cost of capital on new and outstanding debt. These might be incurred before significant benefits from greater efficiency are felt. Such costs could affect both shareholders and consumers. I therefore do not recommend such an approach at this time, though it is likely that this analysis will change over time.

4.110 Another option put forward would be to introduce a competition for the market framework for households and a new bilateral competition in the market mechanism for non-household customers. The advantage of such an approach would be that, as above, in the market competition would, where viable, allow eligible non-household customers to choose an alternative supplier if they were dissatisfied with the price or service offered by their local incumbent. The disadvantage of such an approach would be that, depending on the regulatory capital value at risk, it could increase risk to investors, raising the cost of capital. It would also require the unwinding of geographical transfers and an increase in non-household prices (which could then by offset through a redistribution mechanism) to allow efficient competition. Such an approach would have a net present value between the for the market and in the market models.

4.111 For those elements of the value chain that Ofwat will continue to regulate, while recognising the complex interactions, I see clear benefits from encouraging greater innovation. However, it is important that any such mechanism aligns customers' and companies' incentives.

4.112 In this regard, I am concerned that a system of targeted support for particular innovations may distort decision making, transfer decision making responsibility to Ofwat and shift risks and costs to customers. I believe that a greater incentive to outperform both on costs and level of service or outputs will avoid many of these risks. In cases where it is insufficient, where there may be particular barriers to innovation, such as where a highly collaborative approach is needed, or public good type innovation, it is likely that such projects are better supported at an industry level through the proposed research and development body (see chapter seven).

4.113 It is also important to encourage the right kind of innovation and investment by addressing the potential bias to capital expenditure. The easiest way to achieve this is by removing the direct link between capital expenditure and returns. By introducing a company based capital expenditure assumption, companies would no longer have the incentive to actually spend on capital projects, but to look for the most cost effective solution.

4.114 Regulators also need to fully take into account the long-term nature of the planning horizons water companies are expected to work to and the full range of outcomes being sought. They should endeavour to provide adequate certainty on both outcomes sought and the financing obligations these entail. Regulators should also avoid prescriptive micro management where companies are effectively forced to use tried and tested solutions as the main risk mitigation, but should provide outcome focused performance measures and effective incentives that allow companies to try new ways of working.

4.115 As noted above, the reforms above would be expected to improve the efficiency with which companies procured and operated their assets. As noted above, there are significant differences in companies' current efficiency in both England and Wales. For example, Ofwat's most recent assessments of operating expenditure efficiency found five companies within five per cent of the benchmark for water services and three companies within five per cent of the benchmark for wastewater.[26] Three companies were 25 to 35 per cent less efficient than the benchmark for water and three companies were between 15 and 25 per cent less efficient than the benchmark for wastewater. For capital maintenance expenditure, Ofwat's most recent assessments found 13 companies within 10 per cent of the benchmark for water services and nine companies within 10 per cent of the benchmark for wastewater.[27] One company was 30 to 40 per cent less efficient than the benchmark for water and one company was between 20 and 30 per cent less efficient than the benchmark for wastewater.

4.116 With regard to Wales, Ofwat's most recent assessments of operating expenditure efficiency rated Welsh Water and Dee Valley 16th and 13th out of 21 for water services and Welsh Water 8th out of 10 for wastewater. For capital maintenance expenditure efficiency, Ofwat's rated Welsh Water and Dee Valley twentieth and twenty second for water services and Welsh Water fifth for wastewater.

4.117 Evidence also suggests that the growth rate in efficiency would also rise for the industry as a whole, including for those companies that currently outsource their operations, as competition between companies encouraged increased innovation. So far, the benefits of optimisation have only been calculated for the south-east. However, there will be scope for better optimisation along all company boundaries.

4.118 In considering the costs of reform, the proposals above would not be expected to have an impact on the cost of capital for incumbents and only a minimal impact on operating costs. Were the Welsh Assembly Government and the National Assembly for Wales to consider the appropriateness of a contracting entity at some future point in time, they will want to further consider the potential impacts on financing costs from such reform given Welsh Water's unique "not-for-profit" status. In the round, I would therefore expect reform to deliver benefits in both England and Wales.

Recommendations

4.119 Consistent with a step-by-step approach I recommend reforming the current water supply licensing regime and supplementing it with a market-like framework as soon as is practicable. This will require:

- an obligation for incumbents to procure the best value combination of water, wastewater and infrastructure supplies as part of the regulatory process. Companies' decisions would be scrutinised by a procurement panel with independent members and would be subject to review by Ofwat in making its periodic review determination and the Environment Agency in determining the management of water resources;
- unbundling the current combined supply licence and creating a new upstream licence for companies wishing to introduce raw or treated water into an incumbent's network or remove and treat wastewater or treat and dispose of sludge from it. There should also be a network licence for those looking to provide

26 Ofwat: Relative efficiency assessment 2007-08, 2009 Table 1, viewed on 10 March 2009, <http://www.ofwat.gov.uk/regulating/reporting/ltr_rd0209_releffassess07-08>

27 Ofwat: Relative efficiency assessment 2006-07, 2008 Table 1, viewed on 10 March 2009, <http://www.ofwat.gov.uk/regulating/reporting/ltr_rd2107_releffass2006-07.pdf>

infrastructure. The current structure of licences for incumbents would remain as now;

- mandating the publication of water and wastewater supply costs at a water resource zone level and transport costs across their region based on a common methodology;
- for supplies to incumbents, replacing the costs principle with an ex-ante access pricing framework based on full economic costs. Access prices would be determined by Ofwat at a water resource zone level on a common methodology with reference to guidance from Defra and Welsh ministers. Such an approach 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.
- for supplies to retailers or large customers, replacing the costs principle with an ex-ante access pricing framework based on long-run avoidable costs. Access prices would be determined by Ofwat at a water resource zone level on a common methodology, with reference to guidance from Defra and Welsh ministers. Such an approach should ensure that:
    - an efficient network operator is able to cover their costs;
    - tariffs are non-discriminatory; and
    - efficient sources of supply are supported.
- introducing common operational codes and systems, binding on all market participants;
- creating powers for Ofwat to undertake proactive investigations of non-compliance; and
- ensuring that the Drinking Water Inspectorate has appropriate powers and resources to maintain the quality of, and confidence in, the wholesomeness of the water supply.

4.120 The net present value of such changes could be £1.2 to £2.2 billion over 30 years, set against a total net present cost of around £160 billion. In addition to this, there would be other non-monetised benefits including greater choice and higher service levels.

4.121 In the longer-term, after 2015, I believe that greater benefits may be delivered through a competition for the market model. The net present value of such changes could be £2.8 to £5.3 billion over 30 years, though these values are very uncertain. The decision on whether and when to extend upstream competition should be taken by the UK Government and Parliament and the Welsh Assembly Government and National Assembly for Wales on the basis of advice from Ofwat and other parties and after consultation with stakeholders. It is important that any such reforms are sufficiently flexible to allow the industry to adopt different approaches across the country and over time.

4.122 I welcome Ofwat's decision to introduce greater incentives for innovation through the capital expenditure incentive scheme, but believe it can be developed further. Companies should be given a greater efficiency incentive for significant and sustained outperformance. To introduce the same symmetry and incentives to, such an approach should also be applied to operating expenditure. Ofwat should address the potential bias towards capital expenditure by

adopting a company based capital-operating expenditure ratio assumption as part of the periodic review process. Ofwat should take forward these recommendations as part of their review of regulation, ahead of the process for setting prices from 2015.

4.123 To give the industry the confidence it needs to invest in new ways of working, the UK and Welsh Assembly Governments and regulators should agree clear objectives, including legislation and guidance, and communicate them in a timely fashion.

4.124 Such an approach, reforming both the regulatory and market frameworks of the industry, would encourage greater innovation and the better use of existing resources and reduce the cost of new or replacement assets at very low cost.

5 Retail

Introduction

5.1 In line with the Review's terms of reference, the following sections consider the case for reform of the retail element of the value chain. As set out in the interim report, the aim of such reform would be to: to deliver keener prices, higher and more tailored service standards and more service options, environmental improvements whilst protecting vulnerable consumers. This could be through competition, market-like instruments or regulation. A number of recommendations in the interim report have already been accepted by the UK Government for England. The Welsh Assembly Government asked for further analysis. The focus of this section is therefore on addressing those issues raised in the interim report and by the UK and Welsh Assembly Governments.

Current situation

5.2 At present, only companies likely to use at least 50 megalitres a year at each can choose their water retailer under the Water Supply Licence regime. Unserved developments, large users and customers who can secure an inset appointment by consent may also be served by a different undertaker. All other customers are effectively restricted to buying their water and wastewater services from the local statutory undertaker. As a consequence, the overwhelming majority of the 23 million non-domestic and domestic customers are unable to choose their supplier.

5.3 Prices and standards for these customers are determined by the relevant regulators. Ofwat encourages companies to reduce costs through comparative competition regulation, whereby companies are allowed to retain the financial benefits of outperformance compared to an efficient company for between five and seven and a half years. These issues are discussed in more detail in chapter four on the upstream element of the value chain.

5.4 Capital intensive service and environmental improvements, where they have customer support and are cost-beneficial, are funded directly in price limits at each price review. Environmental and drinking water quality standards are enforced by the Environment Agency and the Drinking Water Inspectorate. Ofwat also encourages companies to further improve their quality and service levels through its overall performance assessment. Annual assessments are published and then used at a price review to make adjustments to reflect the performance of each company relative to others. The adjustment of between positive 0.5 per cent and negative one percent is made in the first year of price limits so the financial impact accumulates through the subsequent five year period. The current assessment measures companies' performance against a range of measures covering customer service, drinking water quality and compliance with environmental standards. The current measure is focused on quantitative indicators such as speed of complaint handling rather than quality of response. Ofwat is in the process of reviewing the incentive mechanism and assessment to refocus it on quality of service and consumer experience.

Result

5.5 As set out in the interim report, while Ofwat's framework for regulating these regional monopolies has delivered benefits including service and quality improvements and reduced bills, it can never truly reflect the complexity, dynamism or demand-driven nature of the market. Comparative competition regulation is partial, periodic and selective and, incentives are limited because companies cannot lose customers. The financial incentive of the overall performance assessment is limited, although it is reinforced by the reputational impact. A number of water companies have noted that reducing the number of sewer overflow incidents would need substantial ground works at significant cost, which could not be recovered through the overall performance assessment (although we note that, where agreed, significant improvements programmes for such items are funded in price limits).

Interim report recommendations and emerging findings

5.6 To address these issues, the interim report recommended introducing greater competition into the retail element of the value chain by:

1 reducing the non-domestic customers threshold from 50 megalitres to five megalitres a year as soon as practicable;

2 extending competition to wastewater retail service and unbundle the combined supply licence;

3 protecting customers through default tariffs and a statutory code on mis-selling;

4 abolition and replacement of the cost principle and a mechanism to reward customers and retailers for measure they take to reduce an incumbent's upstream costs;

5 the introduction of nationally agreed market and operational codes that would be binding on all market participants;

6 on the introduction of a suitable switching mechanism and accompanying changes (below), say in 2012, reducing the non-domestic customer threshold to one megalitre a year;

7 legal separation of both the household and non-domestic retail arms of water companies from the remainder of the appointees' business; and

8 a new self-supply retail permit.

5.7 The interim report also had three emerging findings:

9 that the case for household competition was not favourable in the first instance. Further decisions to extend competition should be taken by Government on the basis of advice from Ofwat and other parties and after consultation with stakeholders. Ofwat should have a duty to assess the market every two years;

10 for those customers ineligible for competition, Ofwat should develop a new performance assessment, in conjunction with the Consumer Council for Water and other stakeholders, more focussed on the customer experience and with greater weight in price limits; and

11 the Government should consult, and work with, interested parties on how any reform should be implemented.

5.8 Such an approach would ensure that customers who would benefit from a choice of supplier with an increased focus to and incentives to represent customers effectively, to reduce costs and drive up standards. As water service companies rather than water retailers, these companies would be better placed and have greater incentives to provide water savings advice, improving environmental outcomes. Customers would be protected from higher prices or poorer service, since default standards and tariffs would be set at current levels. Benefits would also extend to those customers who did not, or were unable to, switch as best practice is transferred from the competitive part of the retailing business to the non-competitive part. Experience in Scotland would suggest benefits are felt quickly, and even preceding the opening of the market to competition as the incumbent improves its offering to retain customers. For example, one-quarter of customers were benefiting from prices below default levels within months of market opening. A market based approach could also reduce Ofwat's information requirements from companies, reducing the overall impact of regulation on companies.

5.9 The UK Government accepted recommendations one to five above in the Pre-Budget Report and was strongly minded to accept recommendation seven.[1]

Box 5.A: UK Government response in the Pre-Budget report

4.67 In the face of economic and environmental challenges, there is an increasing need to find ways to use water more efficiently. In February 2008, the Government commissioned the *Independent Review of Competition and Innovation in Water Markets* to assess the potential to increase efficiencies in water and wastewater markets that would lower prices, improve customer service and deliver environmental benefits. The Review published its Interim Report on 18 November 2008, advocating a phased approach to furthering competition that could deliver significant benefits to the economy over the coming decades. The Government accepts this approach and will take it forward, while bearing in mind the need for the sector to retain access to capital at keen prices.

4.68 As a first step, and in response to the Review's recommendations, **the Government announces a package of measures to extend and enhance retail competition in the water markets for large non-domestic customers in England.** The Government will lower the usage threshold above which businesses and other non-domestic customers are eligible to switch supplier from 50 ML to 5 ML, extend the competition regime to retail wastewater services, remove the current access pricing arrangement for water from legislation (replacing it with simplified criteria to be introduced by Ofwat), and introduce nationally agreed codes to be coordinated by Ofwat in conjunction with stakeholders. The Government is strongly minded to mandate the legal separation of the retail arm of a company from the rest of its operations, in order to deliver further efficiencies and drive non-domestic competition. It will respond to this, and any further recommendations of the Cave Review, once it receives the final report.

4.69 The Government will also keep the merger regime for water companies under review. The Department for Environment, Food and Rural Affairs will launch a public consultation on the implementation of the 5 ML eligibility threshold early in 2009, and will consult on the implementation of the other reforms as part of the Floods and Water Bill. Water is a devolved matter and the Welsh Assembly Government will await further analysis on Wales-specific issues in the final report before providing a response.

1 HM Treasury: Pre-Budget Report, 2008, viewed on 10 March 2009, <http://www.hm-treasury.gov.uk/prebud_pbr08_index.htm>

5.10 In its *Strategic Position Statement on Water*, published in January this year the Welsh Assembly Government said they:

- support measures to encourage innovation and a longer term shift towards a system that recognises the value of the water resource available to Wales;
- remain to be convinced that increased retail competition will deliver any measurable benefits in Wales; and
- want to ensure that the unique not-for-profit model for water service provision currently operating in Wales is given full consideration alongside other approaches to securing better value for customers.[2]

Responses to the interim report

5.11 The interim report asked for stakeholders' views on three issues: the threshold, household competition and the process for extending competition. Responses to these issues are set out below.

Threshold

5.12 The interim report asked if a one megalitre threshold was appropriate in the first instance. The majority of respondents (including Ofwat, the Water Industry Commission for Scotland, Scottish Water Business Stream and the majority of water companies) supported going straight from a five megalitre threshold to no threshold, rather than imposing the one megalitre threshold. Northumbrian Water disagreed, arguing a one megalitre was preferable in the first instance, and South West Water argued against reducing the threshold below five megalitres at all. The Consumer Council for Water suggested further research from business customers using less than five megalitres to inform this decision, and argued it was important to learn the lesson from impacts on small businesses Ofgem's recent market probe, which highlighted concerns about the transparency and fairness of contracts, and the direct sales contact they received, and wanted assurances would be put in place to protect these customers.[3]

Household competition

5.13 The report asked how, if competition were extended to households, vulnerable consumers could best be protected.

5.14 Many respondents were sceptical about the benefits of household competition. They supported a phased approach to its introduction. On the introduction of household competition, vulnerable customers could be protected by:

- changes to the benefits system, means or needs testing;
- simple tariff structures, compulsory acceptance of customers and non-discrimination of prices;
- statutory code on mis-selling;
- information about competition to be made widely available;
- minimum Standards on price and service levels; or

2 Welsh Assembly Government: Strategic Position Statement on Water, 2009. <http//.www.wales.gov.uk/consultations/environmentandcountryside/waterstatement/?lang=en>

3Office of Gas and Electricity Markets Energy Supply Probe – Initial Findings Report, 2008.
<http://www.ofgem.gov.uk/MARKETS/RETMKTS/ENSUPPRO/Documents1/Energy%20Supply%20Probe%20-%20Initial%20Findings%20Report.pdf>

- preventing Cross-subsidies from unwinding and ensuring the WaterSure scheme continues.

5.15 The potential unwinding of so-called "cross-subsidies" is sometimes seen as an obstacle to introduction of household competition. Research commissioned by the Review and the independent review of charging and metering for water and sewerage services has found this can be addressed.[4] The analysis highlights that retail competition can be introduced whilst maintaining tariffs differentiated by rateable value and geographic averaging. With a monopoly wholesale supplier or an independent contracting entity these features can be maintained by setting an appropriate wholesale price structure. The WaterSure aims could be met through wholesale pricing arrangements or through the establishment of a special regulatory scheme to fund rebates to qualifying customers. Mechanisms can also be introduced to prevent the introduction of tariffs differentiated by payment mechanism or creditworthiness, although such mechanisms could bring their own problems.[5]

Decision to extend competition

5.16 The interim report asked how any decision to extend competition should take place. Respondents tended to agree that Ofwat should have a duty to review the market, that any assessment should be based on clear criteria (either the criteria used for this review, or other criteria), and should be consultative. Severn Trent Water suggested the assessment should be annual. United Utilities argued that a previously agreed success criteria for non-domestic retail competition should be met (as well as general cost-benefit measures) before progressing to domestic retail competition.

Overall Performance Assessment

5.17 A number of respondents also commented on the overall performance assessment and believed it failed to adequately reflect local customer priorities or provide sufficient incentive to address a number of key measures. For example, South East Water suggested a "move away from rigid metric particularly in customer facing activities to a measure of satisfaction" and the Consumer Council for Water said "we agree that amendments to existing incentives in the Overall Performance Assessment...could help bring about changes in the level of innovation." Wessex Water argued that "the current overall performance assessment system for assessing water company service levels needs to be overhauled to spur changes and produce greater performance differentiation."

Cost –benefit analysis

5.18 A few respondents commented on the approach of the cost benefit analysis. Ofwat commented that the approach was a useful contribution to decision making, and due to its cautious approach to estimates and also because many benefits couldn't be quantified (such as benefits to aggregation) the net benefits were an underestimate. Northumbrian Water Water thought the analysis was useful but wanted the analysis to be more detailed for the final report. South East Water had some concerns that the approach used might over-estimate benefits and under-estimate costs, this included that separation costs would be would be higher in England and Wales than in Scotland where only non-domestic customer retail functions were separated.

4 Independent Review of Charging and Metering for Water and Sewerage Services, viewed on 10 March 2009, <http://www.defra.gov.uk/environment/water/industry/water-charging-review/index.htm>

5 Reckon LLP: Cross subsidies, price structures and competition in the England and Wales water industry, 2009

Further analysis

5.19 In light of these responses, and at the request of the UK and Welsh Assembly Governments, I have undertaken further analysis of a number of issues, including: the costs of legal separation for different companies, the impact of competition on the cost of capital, models of retail separation and the benefits of retail competition in Wales.

Costs of legal separation

5.20 The UK Government asked the review to consider the impact of legal separation for smaller companies. Evidence presented to the Review by a number of smaller water companies on the costs of legal separation suggests that they believe that the costs of separation will be much higher than found by Wessex Water, Bristol Water and Scottish Water Business Stream. If this were the case, legal separation costs could be higher on a per customer basis for small water companies, and it may be that for the smallest companies that the costs of legal separation may not outweigh the benefits. It follows that, in order to maximise net-benefits, there may be a threshold (say, in terms of company revenue) below which legal separation would not be mandatory. In such instances, companies could be required to introduce functional separation. Alternatively they may wish to sell their retail functions.

Impact of Competition on the Cost of Capital

5.21 Both Ofwat and the water companies have commissioned research regarding the impacts of competition on the costs of financing.[6] As discussed in chapter four, this could be through transitional impacts, where changes to the industry may breach existing debt covenants or de-gearing becomes necessary, or through longer-term impacts on the cost of financing as investors demand a higher cost of capital to compensate them for the increased risk of a competitive environment.

5.22 Following discussions with stakeholders, I have concluded that, introduced appropriately, retail separation is unlikely to incur such costs. The share of the regulatory capital value discount in retail is very small. Retailing functions relating to domestic customers account for the bulk of retail costs will also remain a monopoly. In the case of Wessex Water (where separation was voluntary) I understand that separation did not have significant cost implications. In other companies, such as Welsh Water, which have already outsourced their retailing functions many of the operational costs of legal separation may already have been incurred.

Models of Legal Separation

5.23 Some stakeholders have asked for clarification about how retail separation could work in practice. I believe this is best decided at the appropriate time by the relevant stakeholders. In determining the appropriate model of retail separation consideration should be given to, amongst other things, facilitating efficient competition, minimising barriers to entry, and ensuring viable scope for competition. In this regard, a number of models have been put forward to the review:

- a number of water companies have suggested that, in the first instance, the retailer could be responsible for billing, debt management, payment handling, customer sales and enquires and demand-side water efficiency initiatives. Other functions, including operational enquiries, would remain with the wholesaler. At a later stage, the retailer could become responsible for further activities including metering. The

6 National Economic Research Associates: Financial Implication of Competition Models Water UK, 2009 Nourse, R: Competition proposals and financing issues: a report for Ofwat, 2009. <http://www.ofwat.gov.uk/competition/review/rpt_com_nourse260209.pdf

rationale for such an approach is that it would reduce the costs of separation and reduce barriers to entry;

- as part of its accounting separation project, Ofwat have suggested that the retailer could be responsible for billing, debt management, payment handling, customer sales and enquiries, demand-side water efficiency initiatives, meter reading, maintenance and installation, non-operation enquiries, and developers' services.[7] Such an approach would extend the range of services that a retailer could offer, allowing greater differentiation between competitors.

- at present the separated retailing arm for Wessex and Bristol Water is responsible for (amongst other things) billing, debt collection and customer enquiries. Wessex Water would support the retailer having yet greater responsibilities such as meter ownership, maintenance and installation, and believe the key to successful retail competition across England and Wales would be for retailers to be accountable for all customer-facing activities. This would include, for example, providing water efficiency advice.

- In Scotland responsibilities of retailers include billing, debt collection and payment handling, setting final tariffs (within limits), and all customer-facing activities (although in the event of certain emergencies then there may be direct contact between the customer and the wholesaler).[8] Meter reading is also the responsibility of the retailer, whilst the wholesaler is responsible for maintenance and installation of meters. 'Value added' services of Scottish Water Business Stream include leak management, smart metering, and water, waste water, and trade effluent advice. More details are set out in the market and operational codes.[9]

Benefits of retail competition in Wales

5.24 Cost-benefit analysis finds that Welsh non-domestic customers, who are served by Welsh Water and Dee Valley Water, would benefit directly from retail competition, though given the smaller fraction of customers which are large users of water in Welsh Water and Dee Valley Water than in other companies the benefits are lower than in other, more industrial, areas. Other customers would also benefit from the potential transfer of best practice and the effects of competition on business competitiveness. As elsewhere, I believe that there would also be significant non-monetary benefits from such a change such as increased customer service standards, and retailers acting as water service companies would be better placed and have greater incentives to provide water savings advice, improving environmental outcomes.

5.25 It is the case that a customer who chose to switch from Welsh Water may not receive the customer dividend (£22 this year).[10] However, I believe that customers are best able to determine whether the benefits of switching would more than offset the loss of the dividend. This is more likely to be the case for significant water users, for whom the fixed value rebate has a very small impact.

5.26 However, I do recognise there are benefits of Welsh Water's business model and there could be potential benefits for other consumers if it were to be adopted elsewhere. Advantages

7 Ofwat: Accounting separation: Consultation on allocation of activities between business units, viewed on 10 March 2009,
<http://www.ofwat.gov.uk/competition/pap_con_accountsep.pdf?download=Download#

8 Water Industry Commission for Scotland: Directions Issued to Licensed Providers Pursuant to Standard Licence Condition B1, viewed on 10 March 2009,
<http://www.watercommission.co.uk/UserFiles/Documents/080317%20Default%20directions%202008-09_1.pdf>

9Central Market Agency Ltd: Market Code 2008, viewed on 10 March 2009, <http://www.cmascotland.com/Market+Documents/Market+Code>
Scottish Water: Operational Code, 2008, viewed on 10 March 2009,
<http://www.scottishwater.co.uk/portal/page/portal/SWE_PGP_COMMERCIAL/SWE_PGE_COMMERCIAL/PROD_WHOL_WEL/Operational%20Code%201%20December%202008.pdf>

10 Welsh Water

cited to the Review include (but are not limited to) a relative improvement in the overall performance assessment, the limited increase in household bills compared to other water companies, high customer satisfaction in relative and absolute terms and a growth in reserves (or "customer equity") to just over £1 billion since 2001. However, other stakeholders have noted that Welsh Water is a 'follower' in terms of research and development and that compliance with drinking water standards could be improved.[11]

5.27 I am also aware of the different social, economic and political circumstances in Wales. In this regard, stakeholders have noted that Welsh Water is supported by all political parties; has an open, transparent and accountable way of working and enjoys widespread public support as a 'not-for-profit' organisation. They have expressed concern at the possible extension of competition to Wales, preferring that competition is introduced to England and then extended to Wales if such arrangements prove beneficial.

5.28 Water policy is devolved, and the Welsh Assembly will decide on whether to introduce greater competition. However, I am not convinced that competition would undermine the benefits of such a model. Indeed I would expect competition to reaffirm them as customers would be able to choose Welsh Water as their preferred supplier.

Options for reform

5.29 The interim report suggested that for those customers ineligible for competition, Ofwat should develop a new performance assessment. Ofwat is developing a revised assessment focussed on consumer experience, in consultation with other stakeholders. New experience measures are being piloted including a consumer experience survey. Ofwat will set out its proposals for a revised service incentive mechanism alongside the draft determinations of price limits in July.

5.30 Ofwat has also pointed out that, provided the supplier can demonstrate that their proposals have customer support and are cost-beneficial, significant service improvements are specifically funded in price limits outside the overall performance assessment. Companies have undertaken customer research to inform their proposals, which they have discussed with regional stakeholders. Ofwat, with other regulators, the Consumer Council for Water and other companies has undertaken research to check how acceptable the resulting plans are to consumers in each company's area.

5.31 An alternative approach would be for much greater customer engagement in determining retail quality and service standards In Wales, the Welsh Assembly Government has created a strategy forum as part of the 2009 periodic review process which brings stakeholders together to help determine Welsh Water's and Dee Valley's business plans. In other areas, the Consumer Council for Water has negotiated with each water company and their quality regulators locally. The Consumer Council for Water has encouraged companies to develop plans that are grounded in consumers' views and that they will accept. This has reinforced the consumers' vital role in the setting of prices much more than in the past, and is reflected in the level of acceptability of many (but not all) of the companies' business plans, as measured by consumer research.

5.32 I believe there is value in these models, but that they could be extended. Recent analysis has discussed the potential role of "negotiated settlements" in the regulatory process.[12] In future, there is the potential to develop the role of the Consumer Council for Water further in these negotiations, with the addition of direct input of consumers. Such an approach has worked in regulated sectors overseas and is recognised as a valuable development of incentive

11 Drinking Water Inspectorate: Drinking Water in England and Wales 2007, viewed on 10 March 2009, <http://www.dwi.gov.uk/pubs/annrep07/contents.shtm>

12 S Littlechild: "Constructive engagement and negotiated settlements – a prospect in the England and Wales water sector?", 2008, viewed on 10 March 2009, <http: www.electricitypolicy.org.uk/pubs/misc/NegotiatedsettlementsE&W29Aug08.pdf>

regulation than can deliver greater legitimacy to the regulatory process and deliver benefits for consumers.

5.33 Stakeholders, including the Consumer Council for Water, could negotiate regional agreements with companies reflecting local priorities and willingness to pay. To ensure that these settlements impacted on retailers' ways of working, they could also have a much greater potential weight in price limits or margins of plus or minus three per cent of turnover. It would be for stakeholders to negotiate the size of the settlement, whether it was symmetrical, and what service and quality improvements the local incumbent should deliver. Ofwat, as the economic regulator, would have to be satisfied that the result of such negotiations were in customers' interests. A similar approach could be taken to negotiations between retailers and the wholesaler.

Box 5.B: Negotiated settlements as part of the Civil Aviation Authority 2004 airport price control.[13]

As part of its 2004 airport price control, the Civil Aviation Authority introduced a constructive engagement process between British Airports Authority, the airlines and consumer representatives to help determine volume and capacity requirements, the nature and level of service and quality outputs, the size of investment programme required, the efficient level of future capital expenditure associated with the programme and revenues from non regulated charges by airport to airlines

The Authority's review of the process found that at Gatwick and Heathrow the approach had achieved good consensus on a strategic vision for airport development, had reached agreement on the service quality regime and achieved some alignment on traffic predictions and on overall capital expenditure priorities. However, at Stansted agreement on the key area of whether the Price Control Business Plan should be an input to or an output of Constructive Engagement was not reached and consequently the Civil Aviation Authority took back responsibility

Costs and benefits

5.34 The benefits of negotiated settlements compared to Ofwat's proposed approach are that customers have greater say over the services they want delivered and how much they are prepared to pay for them and companies have a stronger incentive to tailor their services to local customer needs.

5.35 The costs of constructive engagement primarily relate to the commitment by all parties to the process. It is also important that stakeholders have the capacity to undertake such negotiations. This involves both time and involvement of suitably senior or empowered managers but also the corporate willingness to reach an agreement.

Evaluation

5.36 I have carefully considered the responses from stakeholders on the cost-benefit analysis in the interim report. Many of these concerns arose from a misunderstanding of the approach used. While some have argued that the analysis underplays the benefits others have argued that it underplays the cost. Taken together, I have concluded that the cost-benefit analysis remains robust and that there would be significant benefits from the reform of the retail competition

13 Civil Aviation Authority: Airport Regulation,2005, viewed on 10 March 2009, <http://www.caa.co.uk/docs/5/ergdocs/erg_ercp_airportregulation_may05.pdf>

framework. However, I note that a majority of respondents have expressed a preference for abolishing the threshold directly, rather than having an intermediate threshold of one megalitre and allowing aggregation. Given this, and the results of the cost-benefit analysis, I have concluded that a zero megalitre threshold may now be more appropriate.

5.37 Given the level of the threshold is determined is secondary legislation and therefore does not need to be determined now, I would support Ofwat, in consultation with other stakeholders, providing further advice to the UK and Welsh Assembly Governments on whether abolishing the threshold remains appropriate in the future. Such an analysis could be informed by further research into small non-domestic customers' views, how best vulnerable consumers can be protected and the experience from Scotland.

5.38 I remain of the view that, at the current time, it would not be appropriate to extend competition to domestic customers. This does not prejudge an assessment at a later date as part of Ofwat's statutory duty to report on the state of the market. There may also be a case for a de-minimis threshold for legal separation.

5.39 It is clear the current overall performance assessment fails to deliver services that customers really values and I therefore welcome Ofwat's review. While issues have been raised around the time needed to participate effectively (especially for smaller regulatory bodies and companies) and obtain appropriate representation in negotiated settlements, the experience from the United States and Canada demonstrates that these can be overcome. Experience is also being gained in the United Kingdom.

5.40 I therefore believe that there are potentially significant advantages to local customers and retailers, rather than the national regulator, deciding their priorities as they are better able to judge both what they want and how much they are prepared to pay for it. But such an approach should be evolutionary rather than revolutionary. An approach that increased both the scope and size of negotiations and strengthened the capacity of stakeholders over time would therefore seem appropriate. Over time, I would therefore expect the role of Ofwat in the negotiated settlement process to decline, although as the economic regulator, it would remain responsible for setting price limits.

5.41 While stakeholder engagement in determining prices, service and quality levels is greater in Wales than in England, the reforms proposed here would build substantially on these arrangements by giving consumers and consumer representatives a direct rather than advisory role in determining charges and standards.

Recommendations

5.42 On the basis of responses to the interim report, I now believe there may be practical benefits from abolishing the non-domestic threshold, rather than retaining a one megalitre threshold with aggregation, on the introduction accompanying measures. However, given that the threshold is determined through secondary legislation, I recommend that nearer the time, Ofwat as part of its statutory duty to assess the state of the water markets, should advise the UK and Welsh Assembly Governments on whether abolishing the threshold remains appropriate, based on:

- research, lead by the Consumer Council for Water, on small non-domestic customers' views;
- experience gained from Scotland and, as appropriate, elsewhere;
- an assessment of the costs and benefits; and
- appropriate measures being put in place to protect vulnerable customers.

5.43 Legal separation should be mandatory except where such separation would lead to unavoidable and unacceptably large bill increases to customers that outweighed the monetary and non-monetary benefits of such separation. Ofwat should advise government on whether a threshold is appropriate and if so, its level. In such cases, functional separation could remain appropriate.

5.44 The decision on whether and when to extend retail competition to other customers should be taken by the UK and Welsh Assembly Governments and the UK Parliament and the National Assembly for Wales on the basis of advice from Ofwat and other parties after consultation with stakeholders.

5.45 Such changes should be accompanied by negotiated settlements between the Consumer Council for Water, retailers, wholesalers and other stakeholders, initially to determine quality and service standards for wholesale supply. These should have significant weight in price limits of plus or minus three percent of turnover. It will be for retailers together with other stakeholders to negotiate the size of the settlement, whether it is symmetrical, and what service and quality improvements the local incumbent should deliver. As the economic regulator, Ofwat would remain responsible for agreeing and incorporating the results of such negotiations in price limits. I would expect such an approach to develop over time.

5.46 For those customers ineligible to choose their supplier, I recommend that there should be further negotiated settlements between customer representatives and monopoly retailers, initially to determine retail quality and service standards. Again, these should have potential weight in price limits of plus or minus three per cent of turnover and reflects local priorities. It will be for the Consumer Council for Water, together with other stakeholders, to negotiate the size of the settlement, whether it is symmetrical, and what service and quality improvements the local incumbent should deliver. As the economic regulator, Ofwat would remain responsible for agreeing and incorporating the results of such negotiations in price limits.

5.47 Together these measures will allow many non-domestic customers to choose the combination of service and price that they prefer. Retailers will also be able to better represent their customers' interests with wholesalers. Although domestic customers will not be able to choose their supplier, they will benefit from any spillovers from non-domestic competition and will have a greater say over the services they receive.

6 Industry structure

Introduction

6.1 In line with the Review's terms of reference, the following chapter considers the case for the reform of the special merger regime. The aim of such a change would be to deliver water and wastewater services at lower cost to the environment and customers through increased pressure on management to improve their services, the more rapid transfer of best practice, greater economies of scale and scope, including in research and development, and, in the case of mergers between neighbouring companies, the better use of resources.

6.2 This chapter also considers the case for reform of the inset appointment regime, whereby an appointee is able to replace the local incumbent. The aim of such reform would be to allow alternative providers with different business models, ways of working and technologies to deliver water and wastewater services, benefiting customers and the environment directly and improving services for all, through the transfer of best-practice.

Mergers

6.3 The water industry has been subject to special regime since the early 1990s. However, since 2004 there has also been a reference test under which the Office of Fair Trading must refer to the Competition Commission any merger of two or more water undertakings where one or more of the merging companies has a turnover of at least £10 million, on the basis that the merger could have a detrimental impact on Ofwat's ability to regulate water industry prices on the basis of comparative competition. Such a mandatory reference would apply to any merger between existing companies used for comparative purposes.

6.4 The Competition Commission is then required to determine whether such a merger may be expected to prejudice the ability of Ofwat to make comparisons between different water companies for the purpose of regulating them. If the Competition Commission determines that a merger does prejudice Ofwat's ability to make comparisons, then it may impose remedies or take no action.[1] The remedies that the Competition Commission can impose may be structural (for example divestment) or behavioural (for example reimbursing consumers harmed as a consequence of Ofwat's inability to regulate water companies as effectively).

6.5 This regime replaces the normal merger regime under which the Office of Fair Trading has a duty to refer a merger to the Competition Commission for further investigation if it believes that there is a realistic prospect that the merger gives rise to a substantial lessening of competition within any market or markets for goods or services in the UK. The Office of Fair Trading is not empowered to examine all mergers. To qualify for examination by the Office of Fair Trading, the acquired company must have a UK turnover of £70 million a year or the combined entity must

1 Competition Commission: Water merger references: Competition Commission Guidelines. 2004, viewed on 10 March 2009, <http://www.competition-commission.org.uk/rep_pub/rules_and_guide/pdf/cc9.pdf>

have a 25 per cent share of supply of any description of goods or services (where the merger has given rise in an increment in that share of supply).[2]

6.6 Even in situations where the Office of Fair Trading finds that a merger does give rise to a realistic prospect of an substantial lessening of competition, the Office of Fair Trading may nonetheless choose to exercise its discretion not to make a reference to the Competition Commission in the following circumstances:

- if it believes that the market or markets concerned are not of sufficient importance to justify a reference;
- if it accepts undertakings proposed by the merger parties in lieu of reference (such as divestments); or
- if there are relevant customer benefits from the merger that outweigh the substantial lessening of competition.

Result

6.7 The current system has therefore increasingly discouraged mergers. Under the mandatory reference regime, there has only been one water merger since 2004 - between Mid Kent Water and South East Water in 2007 - despite significant industry interest in further consolidation. As a result, there are currently 10 water and sewerage companies and nine independent water-only companies in England and Wales, with water only companies particularly prevalent in the South of England for historical reasons.

Interim report emerging findings

6.8 The interim report proposed that the Government should, with stakeholders, reconsider the costs and benefits of the special water merger regime, and whether, with accounting separation, sub-company data could provide an adequate basis upon which Ofwat could base its price control regime, allowing the relaxation of the special water merger regime.

Responses to interim report

6.9 The report asked respondents how the special merger regime should be reformed upon the introduction of retail competition.

Reforming the special water merger regime

6.10 The respondents generally believe that if retail competition is introduced, the special merger regime should be either reformed or abolished from the outset (Severn Trent, the Consumer Council for Water, Northumbrian Water, Ofwat and United Utilities), South East Water and South West Water both believe that the merger regime should be streamlined. Ofwat believed that the Office of Fair Trading should have a duty to refer water and sewerage mergers based on two tests:

- whether the merger was expected to prejudice comparative competition (the Competition Commission's current test under the special water merger regime), or whether the merger was expected to result in an substantial lessening of competition (the Office of Fair Trading's current reference test for all other mergers); and

2 Office of Fair Trading: Mergers: substantive assessment guidance, 2003, viewed on 10 March 2009, http://www.oft.gov.uk/shared_oft/business_leaflets/enterprise_act/oft516.pdf. Neither is notification of mergers to the Office of Fair Trading mandatory—that is, merging parties are under no obligation to notify their merger to the Office of Fair Trading and can complete their merger at any time—although the Office of Fair Trading does have the power to investigate non-notified mergers under its own initiative.

- where retail service companies are structurally separated from other regulated businesses, they should be excluded from all special merger controls, at least where all their customers are able to choose their supplier. In these circumstances, the general merger regime would apply and the merger judged against the substantial lessening of competition test.

Options

6.11 As detailed above, the aim of reforming the special water merger regime would be to deliver water and wastewater services at lower cost to the environment and customers through increased pressure on management to improve their services, the more rapid transfer of best practice, greater economies of scale and scope and, in the case of mergers between neighbouring companies, the better use of water resources.

6.12 This could be achieved by reducing the impact of a loss of a comparator or by facilitating mergers that would benefit customers and the environment. In this regard, the following section therefore considers:

- Ofwat making greater use of alternative data;
- Ofwat reforming the way that it assesses the impact of a loss of a comparator;
- lifting the threshold for referrals;
- reforming the threshold;
- removing automatic reference to the Competition Commission; and
- abolishing the special water merger regime altogether.

With the exception of the final option, elements of these approaches could be combined.

Use of alternative data sources and techniques

6.13 At the moment, Ofwat bases its econometric analysis on a cross section of cost and other data for all water companies at a given point in time, using a methodology known as 'corrected ordinary least squares'. Both alternative data and techniques are available, are used by other regulatory authorities to support comparative competition, and could be used more widely by Ofwat. Alternative data includes: panel data (cost and other data for all water companies over time, not just at a given point in time), sub-company data and comparators from other industries. Such data could be both along and across the value chain. Alternative techniques include data envelopment analysis, stochastic frontier analysis and benchmarking.

Reforming assessment of a loss of a comparator

6.14 Under the special water merger regime, Ofwat submits evidence to the Competition Commission on the impact of a loss of a comparator, as do the merging parties. This is then considered by the Competition Commission in forming a judgement as to whether the merger prejudices Ofwat's system of regulation by comparative competition. The criteria, weightings and methodology used by Ofwat in this assessment are not transparent, resulting in considerable uncertainty for merging parties. This was clearly demonstrated in the Mid Kent Water and South East Water Merger where Ofwat estimated the value of the loss of a comparator at £200 million over 30 years, but the Competition Commission concluded that the estimate was in fact £9 million.[3] An alternative would be for Ofwat to publish the criteria,

3 Ofwat: Ofwat's initial submission to the Competition Commission following the acquisition of South East Water by Utilities Trust of Australia and Hastings Diversified Utilities Fund, 1997, .paragraph 6.11, viewed on 10 March 2009 , .<http://www.competition-commission.org.uk/inquiries/ref2006/water/pdf/initial_submission_ofwat.pdf>

weightings and methodology it would apply in an assessment (for example, that used by the Competition Commission in the Mid Kent Water and South East Water merger) and to develop such an approach in conjunction with other stakeholders.

Lifting threshold

6.15 Under such an approach, the current turnover threshold for mandatory reference of £10 million could be increased. Indexing the threshold to the retail price index would raise the threshold to £12 million, but given the turnover of existing water companies, this would not allow any further mergers. Raising the threshold to £20 million, for example, would allow the merger of four water only companies, and to £70 million as with the wider merger regime, eight water only companies.

Reforming threshold

6.16 Here, the nature of the threshold could depend on the turnover of the smallest company rather than the turnover of each of the merging companies, as with the wider regime.

Remove the automatic reference

6.17 Under such an approach, a prejudice test would remain, but there would be a stage one assessment by the Office of Fair Trading, rather than an automatic reference to the Competition Commission. Given that the Office of Fair Trading is an expert body on competition assessment, rather than being well placed to carry out a detailed comparative prejudice assessment, this evaluation could be informed by a published assessment of the value of a comparator by Ofwat, similar to the approach adopted by Ofgem, for example using the methodology adopted by the Competition Commission in the Mid Kent Water and South East Water merger. Alternatively, in response to a proposed merger, Ofwat could provide an initial assessment of the expected impact of the loss of a comparator and propose remedies to the Office of Fair Trading.

Abolishing special water merger regime

6.18 This would remove both the threshold and the prejudice test. As appropriate, the Office of Fair Trading would then assess a qualifying water merger in the same manner as any other merger - on the basis of whether it gives rise to a realistic prospect of a substantial lessening of competition and whether these outweigh any relevant customer benefits.

Costs and benefits

Benefits

6.19 While the use of alternative data sources and techniques may not completely offset the loss of an independent comparator, as Ofwat has already demonstrated in the comparative competition regime for wastewater, such approaches can be a useful supplement to its core methodology. Other regulatory authorities have gone further and made such sources and techniques a central element of their comparative competition regimes. In a previous merger assessment, the Competition Commission also recommended that Ofwat investigate these alternative sources and techniques.[4] If Ofwat were to make greater use of such information and approaches, I would expect the impact of a loss of a comparator to decrease, and for this to be reflected in assessments of the impact of a merger on the ability of Ofwat to make comparisons, increasing the scope for mergers.

4 Competition Commission: Vivendi Water UK PLC and First Aqua (JVCo) Limited: a report on the proposed merger, 2002, p30, viewed on 10 March 2009, <http://www.competition-commission.org.uk/rep_pub/reports/2002/fulltext/472c2.pdf>

6.20 The benefits of a transparent assessment methodology are in giving merging parties much greater regulatory certainty about the criteria, weightings and methodology that Ofwat would use in the evidence that it submits to the Competition Commission. Companies could then use this information to decide the likely scale and nature of any remedies and, on this basis, decide whether to proceed with the merger. By working with stakeholders, Ofwat would be able to benefit from the experience of others and there would be a shared understanding of the approach adopted.

6.21 The benefits from reforming the regime include, but are not limited to:

- increased pressure on companies to improve their performance. As there would be greater scope for underperforming companies to be taken over and sold. Although monopoly companies cannot lose customers, as in other industries, their value will reflect their relative performance. In the cases where takeover did occur, I would expect there to be rapid transfer of best practice from the higher performing company to the lower performing one;
- economies of scale, given that data for water companies in England and Wales finds that, on average, small companies are less efficient that larger companies. There are also economies of scope where inputs are shared. This tends to supported by wider research in other industries, although set against this more limited work for Ofwat was inconclusive;[5]
- In this context, for the current regulatory review period, the range of water companies' over- and under-performance in the efficiency of their operating expenditure relative to Ofwat's benchmark varies from 15 per cent over-performance to 12 per cent under-performance, with an average of around two per cent over-performance. For the efficiency of capital expenditure, the range varies from over-performance of 21 per cent relative to Ofwat's benchmark to a slight under-performance of one per cent, with an average of nine per cent over-performance.[6] A five per cent decrease in such variation would result in savings of £45 million a year. These issues are discussed further in chapter four;
- in the case of neighbouring companies, greater optimisation on new and existing assets. In the case of the South East of England, the Environment Agency has estimated that greater optimisation of water resources could increase the yield from existing resources by at least two per cent, and reduce the need for new resources by around 20 per cent relative to companies' current proposals for capital programmes in their water resource management plans, saving £260 million;
- lower financing costs, particularly for small companies. For example, as part of its 1999 price review, Ofwat agreed a small companies' premium of between 40 and 75 basis points on the weighted average cost of capital five per cent. In the 2004 review, Ofwat agreed a premium of between 30 and 90 basis points on a weighted average cost of capital of 5.1 per cent for the period 2005-10. The net present value of such a premium over 30 years would be around £280 million. There are also further differences in the cost of borrowing for larger companies; and

5 ACIL Tasman: Size and scope economies in water and wastewater services: an investigation into economies of size and scope associated with alternative structures for the Water Corporation's activities, 2007, pp11-36, viewed on 10 March 2009, <http://www.era.wa.gov.au/cproot/6227/2/ACIL%20Tasman%20-%20Size%20and%20Scope%20Economies%20in%20Water%20and%20Wastewater%20Services.pdf> Stone and Webster: Investigation into evidence for economies of scale in the water and sewerage industry in England and Wales, 2004, viewed on 10 March 2009, .
<http://www.ofwat.gov.uk/legacy/aptrix/ofwat/publish.nsf/AttachmentsByTitle/stone_webster_150104.pdf/$FILE/stone_webster_150104.pdf

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- avoiding the uncertainty and cost of a referral to the Competition Commission itself. A stakeholder suggested the legal and administrative costs could be of the order of millions of pounds.

One large water company has therefore suggested that mergers could reduce costs and allow customer bills to fall by six per cent when compared to the status quo.

6.22 Reforming the threshold would encourage efficient mergers where one party was above the threshold, as with the wider regime.

6.23 Removing the automatic reference to the Competition Commission could reduce the time and costs of a potential merger, as with the wider regime. Abolishing the regime altogether would further reduce the potential time and costs involved.

Box 6.A: Water resources in the south-east.

The seven water companies in the south-east together with the Environment Agency and other stakeholders have developed a least cost optimisation model for the southeast region.[7] The model selects the least-cost set of schemes to balances supply and demand across the south-east until 2035. The Environment Agency claim that the regional modelling solution is around £260 million lower on a discounted basis over the period than the aggregate of the companies draft water resources management plans because existing surpluses can be transferred to locations where resources are inadequate, companies achieve excessive over capacity required to meet their target headroom and future resources can be better optimised when company boundaries are ignored. However, the report acknowledges the poor quality of the cost data provided by companies. As a result, the study finds that only three of the five reservoir proposals put forward are needed, with effluent re-use and desalination providing the remainder of the supply-demand balance. There may be opportunities to achieve greater gains considering a fuller set of options, particularly the conjunctive use of resources. These could increase the yield from existing resources, perhaps to five or 10 per cent.

Costs

6.24 There should not be significant costs from Ofwat adopting alternative data sources and techniques. However, there may be additional costs to companies from collecting data where this is not collated already. I would not expect publication of their approach to the impact of a loss of a comparator to have significant cost implications.

6.25 By definition, a merger must result in the loss of an independent comparator. The exact value will depend on the size, nature and circumstances of the merging companies because these will have different implications for any prejudice to the econometric, cost base and qualitative comparisons that Ofwat makes between water companies.[8] It will also depend on the extent to which Ofwat chooses to supplement its current approach with alternative data sources and techniques.

6.26 However, by way of indication, under Ofwat's current methodology in the Mid Kent Water and South East Water merger, the Competition Commission found that the net present value of the customer detriment from one type of prejudice (the 'precision prejudice') from the loss of a generalised comparator was £9 million for operating expenditure and £1.3 million respectively

7 Environment Agency: Water resources in the south east: a shared strategy, 2008.

8 In the Mid Kent Water/South East Water merger, the Competition Commission identified two separate possible prejudices to Ofwat's econometric comparisons: the 'benchmark prejudice' (whereby the merger removes a leading comparator in Ofwat's econometric models of operating and/or capital maintenance expenditure) and the 'precision prejudice' (whereby, by removing a statistical data-point, the merger reduces the precision of the estimates in Ofwat's econometric models of operating and/or capital maintenance expenditure).

for capital maintenance expenditure.[9] In the Mid Kent Water and South East Water merger, the merging parties were atypical so the Competition Commission found that the specific loss of these comparators was £0.3 million and £0.9 million for operating expenditure and capital maintenance expenditure respectively. The Competition Commission therefore concluded that a behavioural remedy in the form of a one-off lump-sum reduction of £4 million in bills to customers of Mid Kent Water and South East Water was appropriate, although it also considered structural remedies.

6.27 Furthermore, the Competition Commission calculated the impact of the loss of a comparator on the confidence intervals of Ofwat's operating and capital expenditure models. This suggests the impact rises as the number of comparators falls, but that the costs only rise significantly as the number of comparators falls to 15.[10]

Table 6.A: Impact of loss of a comparator on Ofwat's confidence intervals

Number of comparators	Increase in width of confidence interval (per cent	
	One cost driver	Two cost drivers
22	2.6	2.7
21	2.7	2.9
20	2.9	3.1
19	3.1	3.3
15	4.1	4.4
10	6.9	8.0

Source: Competition Commission

6.28 By analogy, Ofgem also adopts a behavioural remedy in the case of the merger of electricity distribution companies It required merged companies to reduce prices to their customers by £32 million in 2001-02 prices over five years.[11] In considering the loss of a comparator, Ofgem believes that in electricity distribution, having 14 companies with only seven different owners was sufficient to instil competition between management teams similar to the rivalry in a competitive market. It was also a sufficiently small number to allow Ofgem to get relatively close to the individual companies' submissions. It used a mix of statistical analysis and qualitative comparisons in order to set prices.

6.29 Lifting the threshold would allow the merger of smaller companies without offsetting remedies to address any detriment. The generalised cost under the present regulatory regime could be of the order of magnitude set out above - although it should be noted that in the Mid Kent Water and South East Water merger the Competition Commission found that the merger had given rise to only one of the four possible prejudices that it considered - the precision prejudice. The actual cost of any other merger would therefore depend not only on the specific impact of that merger on the precision prejudice but may also involve one or more of the other three types of prejudice that the Competition Commission considered.

6.30 In this context, it is worth noting that while Portsmouth was the frontier company for operating expenditure in 2007-08, it was considered too small to be a benchmark so could not give rise to a benchmark prejudice for example.[12] South Staffordshire was ranked fifth and

9 Competition Commission: South East Water Limited and Mid Kent Water Limited: a report on the completed merger of South East Water Limited and Mid Kent Water Limited,, 2007, pp33-66, viewed on 10 March 2009, <http://www.competition-commission.org.uk/rep_pub/reports/2007/fulltext/525.pdf>

10 Ibid Page 45 table 5.

11 Office of Gas and Electricity Markets: Mergers in the electricity distribution sector: policy statement, 2002, viewed on 10 March 2009, .
<http://www.ofgem.gov.uk/About%20us/enforcement/mergers/oft/Documents1/mergersandaquisitions%2048.pdf>

12 Ofwat:Regulatory efficiency assessment 2007-08, Table 1, viewed on 10 March 2009, <http://www.ofwat.gov.uk/regulating/reporting/ltr_rd0209_releffassess07-08>

Bournemouth and West Hampshire sixth. Ofwat no longer publishes data on capital maintenance expenditure efficiency. However, in 2006-07 Ofwat assessed the most efficient company to be Portsmouth.[13] However they did not use Portsmouth, Cambridge or Folkestone and Dover as the benchmark, but Yorkshire, ranked fifth. Three Valleys was sixth. The net cost will depend on the extent to which Ofwat chooses to supplement its current approach to offset any such loss and the direct benefits of such a merger. As set out above, Ofgem considers 14 companies with seven different owners to replicate a competitive market.

6.31 I do not believe that there is a cost from reforming the threshold so that it applies only to the smaller of the merging companies. Indeed, the maintenance of such an approach may prevent efficient mergers where one party was above the threshold. This is recognised in the wider merger regime to the extent that it is only the UK turnover of the business that is being taken over that is taken into account in determining jurisdiction.

6.32 Removing the automatic reference could potentially increase the overall time required to approve a merger if the 'first stage' assessment by the Office of Fair Trading resulted in a reference to the Competition Commission. Depending on the approach it could also limit the scope for the adoption of appropriate remedies. Under a tariff approach with behavioural remedies, the requirement for no detriment at the first stage could result in an excessive tariff in most instances. As such an approach would exclude the possibility of structural remedies, for example divestments, at the first stage, it could also result in sub-optimal outcomes because even an effective behavioural remedy can only mitigate the effect of the merger's prejudice to Ofwat but cannot remove the cause of the prejudice. In both cases, where the Competition Commission made the final decision, the additional stage could be seen as an extra burden.

6.33 The impact of abolishing the regime for the competitive elements of the value chain (in the first instance retail) will depend on the nature and scale of such competition. At least initially, there is likely to be limited competition as the market becomes established. However, the legal separation of retailers will increase Ofwat's ability to undertake comparative competition as it could create at least 21 new comparators. Furthermore, to the extent that the retail function is relatively similar across industries (and particularly utilities) external comparators may offset any mergers between water companies. It is the case that household customers will not be able to switch supplier. However, applying the results of competition for small non-household consumers to household customers is straightforward.

Summary

6.34 The possibility of mergers is likely to drive an improvement in industry performance and there are likely to be mergers where the impact of a loss of a comparator is more than outweighed by the benefits from greater cost efficiency or the optimisation from the merger of two companies. The value of a comparator is likely to rise, however, as the number of companies falls. The size of any prejudice will depend on the methodology that Ofwat adopts to undertake comparative competition regulation.

Evaluation

6.35 On the basis of the evidence above, I believe that there are strong grounds for reforming the special water merger regime. The threat of capital market competition should lead to improved management performance and, where takeovers do take place, in the transfer of best practice. Furthermore, as the impact of climate change becomes more pronounced, the optimisation of resources will become more important in securing security of supply at lowest cost. The current approach for assessing mergers can also be very resource and time intensive

13 Ofwat: Relative efficiency assessment 2006-07, Table 1, viewed on 10 March 2009, <http://www.ofwat.gov.uk/regulating/reporting/ltr_rd2107_releffass2006-07.pdf>

and the outcome relatively uncertain. These issues are particularly pertinent for small companies, who are often at a disadvantage.

6.36 I recognise the value of comparators to Ofwat's ability to undertake yardstick competition regulation. However, in assessing the value of such comparators it is important to consider the impacts of legal and accounting separation on the number of comparators available. Furthermore, I am very concerned that Ofwat's limited use of alternative data sources and techniques, despite considerable discussion, is effectively blocking mergers that would be in the interest of customers and the environment. I believe that with such changes, there is scope for considerable consolidation in the sector to the benefit of customers of the merged companies and without prejudice to other customers. A lack of ex-ante transparency in the way Ofwat assesses the impact of potential mergers and the need for remedies could also create significant uncertainty and cost.

6.37 In the case of retail only mergers, I am not persuaded that there is an on-going need for a special water merger regime. Any detriment should be offset by the combination of the effects of legal separation, the application of data from the competitive market and the use of data from other industries. Under such circumstances, it is appropriate that such mergers are considered under the wider merger regime.

6.38 I therefore support an approach which recognises the value of a comparator, but which also encourages mergers where these would be in the interest of customers and the environment. Such an approach should:

- limit the regime to those areas dominated by regulation - excluding retail;
- recognise the value of legal and accounting separation – significantly improving the power of Ofwat's existing approach to comparative competition;
- use the widest source of information possible – including alternative data sources;
- make use of the full range of methodologies - adopting alternative statistical techniques;
- assess the threshold on the turnover of the smaller comparator – not on both companies;
- recognise the relative scale of benefits from a merger – which are, on average, likely to be greater from a merger with a smaller company;
- be transparent and predictable – based on published information and criteria; and
- have low financial and administrative costs – avoiding references to the Competition Commission where this is not necessary.

6.39 This could be achieved by removing retail only mergers from the special water merger regime altogether, raising the threshold to exclude the smallest companies and reforming the threshold so that it applies to the smaller company. For larger companies, I am attracted to the increased regulatory certainty that would come from a tariff approach, as in the case of electricity distribution. However, depending on the way it was implemented, such an approach may not have the desired outcome and mergers may ultimately continue to be assessed by the Competition Commission but with greater delay.

6.40 At the same time, I continue to believe that the current framework is potentially preventing mergers that would be in the interest of consumers and the environment. To increase levels of regulatory certainty, Ofwat could develop, in conjunction with stakeholders, a common approach to the assessment of the value of the loss of a comparator and potential remedies. This should be based on clear, transparent criteria with appropriate weightings and

methodology. Ofwat could also develop its data sources and statistical techniques to reduce the impact of the loss of any comparator. Under such circumstances, it would be appropriate to introduce a new first stage test where the Office of Fair Trading considered the need for a referral with advice from Ofwat based on a published methodology. If such an approach did result in a significant improvement after five years, the Government may wish to consider a tariff approach.

Recommendations

6.41 I believe that the special water merger regime should be reformed. There are potentially significant economic and environmental benefits to be gained from mergers between water companies and, with appropriate safeguards, I believe these benefits can outweigh the loss of a number of the comparators. I therefore recommend:

- on the introduction of retail competition, removing retail only mergers from the special water merger regime altogether;
- raising the qualifying threshold for the special water merger regime to a maximum of £70 million and reforming the threshold so that it applies to the smallest company, as in the wider regime. The UK Government should then keep this threshold under review;
- Ofwat commissions an independent review of the scope for making greater use of alternative data sources and statistical techniques and their impact on the loss of a comparator and continues to refine its econometric modelling techniques to take advantage of the information from alternative data sources;
- Ofwat is given a statutory duty to develop and publish guidance on its approach to assessing the loss of a comparator after consultation with stakeholders. This should set out the criteria, weightings and methodology used in any future assessment.
- introducing a new first stage test. Based on its published guidance, Ofwat should provide specific advice on a merger to the Office of Fair Trading, including an assessment of the scale of any prejudice. The Office of Fair Trading should consider that advice, as well as any other competition effects arising from the merger and the scope for structural or behavioural remedies, when considering the need for referral to the Competition Commission; and
- The Government should review the success of the regime after five years.

Insets

Current situation

6.42 At the present time, the local incumbent can be replaced by another undertaker (an inset appointee) in the following circumstances:

- a large user likely to use at least 50 megalitres a year in England and 250 megalitres in Wales;
- an unserved site; or
- a consented transfer between undertakers.

6.43 As an undertaker, an inset appointee can provide all water and wastewater services from abstraction of water, through treatment and distribution to collection, treatment and discharge of wastewater and disposal of sludge.

6.44 There are a number of practical barriers to such supply. Many of these are set out in chapter four on upstream competition. In addition, stakeholders have raised concerns about the appropriateness of the legal and regulatory frameworks for such appointments.

6.45 Specifically, appointees have raised:

- the need for individual inset licences for each site. Appointees consider this excessive once they have established they have a viable business model with Ofwat;
- the definition of an unserved site. Ofwat's guidance currently asks for "evidence that the site contains no premises that are, or will be, connected to an undertaker's mains or sewers at the time when the appointment is to be granted." Appointees consider this unnecessarily restrictive;[14]
- the appropriateness of transposing of current licence conditions used for the water and water and sewage companies to appointees' individual sites given their size and the range of activities they undertake. Appointees believe more conditions could be removed or included with a 'trigger';
- the costs of negotiating access with incumbents. Site specific connection and supply charges increase the costs of offering developers appointments and the time taken progress them. Appointees would welcome indicative charges and reference offers; and
- the lack of a standard industry approach to providing terms to inset appointees. Individual supply contracts also increase the costs of offering developers appointments and the time taken progress them. Appointees believe national codes and standards together with contracts with standard terms and conditions would reduce these costs substantially.

6.46 Incumbent have questioned:

- the expectation that bulk supply prices will be based on the large user tariffs, which may fail to recognise the value of services they provide, such as supplying capacity for peak flow;
- the distribution of connection charges between the incumbent and the appointee, with costs estimated to exceed income by £440 million over the 2005-10;[15]
- the impact of alternative infrastructure ownership on incumbents' charges. Alternative ownership would lead to an increase in charges to existing customers as new customers, who may be cheap to serve because of low maintenance costs would no longer subsidising existing customers. (In the long-term this is offset by the reduced cost of maintenance as responsibility for these new customers is with the appointee). If all new connections were to be owned by other providers, this could potentially reduce the transfer from new customers by approximately £45 million a year by the end of the period; and
- the potential impact on water quality, service and infrastructure standards of poor compliance with and enforcement of regulation by appointees. If regulations are not complied with or enforced appointees could potentially offer customers poorer prices and service.

6.47 Regulators and customer representatives have raised the following issues:

14 Ofwat: Policy on new appointments and variations, 2009, viewed on 10 March 2009, <http://www.ofwat.gov.uk/competition/prs_web_insetpolicyletter230109>

15 Ofwat: Future Water and Sewerage Charges 2005 – 10, 2004 Page182, viewed on 10 March 2009, <http://www.ofwat.gov.uk/pricereview/pr04/det_pr_fd04.pdf>

- the lack of a statutory role for the Drinking Water Inspectorate in approving inset appointments' fitness to supply; and
- the lack of choice for potential customers on unserved sites.

Result

6.48 To date, there have been 18 inset appointments: 11 for unserved sites, four for large user and three by consent. There are currently 40 potential appointments waiting for approval – all for housing developments on unserved sites, and discussions with stakeholders suggest that many more are likely to be brought forward in the near future.

6.49 However, because of a lack of access to resources, security of supply requirements and incumbents' regionally averaged prices based on a discounted regulatory capital value, so far these appointments have only undertaken retailing activities and built new infrastructure. None have abstracted and treated water or treated and discharged wastewater directly, although there are proposals for such developments in the future.

6.50 While Ofwat has recently published interim guidance on the inset regime, there is widespread dissatisfaction with the current regulatory and legal framework.[16] This problem is becoming more acute in the light of the increased number of proposals for housing or mixed use developments on unserved sites. Key areas include: the fitness for purpose of the appointment process, supply and connection prices, impact of insets on price and quality for existing and inset customers.

Interim report emerging findings

6.51 The interim report argued that in the longer-term, customers and the environment would be best served by replacing the current system of undertakers and inset appointments with an independent procurement entity. This would enable inset appointees to provide upstream, infrastructure and retail services to a much wider market on an equal footing with incumbents and other providers. In the interim, the Review suggested that insets provided a way of allowing appointees to challenge existing undertakers and that this could potentially bring benefits to customers and the environment but to address the issues raised above, Ofwat should consider the need for additional changes to the inset regime and published revised guidance as soon as possible.

Responses to interim report

6.52 Few respondents raised this issue. Those who did, including Welsh Water, Scottish and Southern Energy and United Utilities, echoed the concerns above and the urgent need for clarity from Ofwat on the treatment of appointments.

Options

6.53 The aim of reforming the inset regime would be to support entry into the industry of new providers with alternative approaches where such entry would benefit the environment and customers, directly by supply or indirectly through the transfer of best practice. These objectives could be achieved in a number of ways. In the following section, I consider three stylised models: a reform model which builds on the current approach, a replacement model which incorporates the inset regime in to a modernised upstream competition framework as set out in chapter four and abolition.

16 Ofwat: Policy on new appointments and variations, 2009, viewed on 10 March 2009, <http://www.ofwat.gov.uk/competition/prs_web_insetpolicyletter230109>

Reform model

6.54 Under the reform model, the current process of appointment and regulation would be replaced by a new framework of regulated access. At the same time, the system of charges and payments would be updated to ensure that costs were attributed fairly.

6.55 A system of regulated access would set out the scope for inset appointments, the information incumbents and potential appointees would have to provide as part of the appointment process and the timeframes for doing so, and the requirement for incumbents to act in a non-discriminatory fashion. As appropriate, it would also set out standard terms and conditions for inset supplies.

6.56 Assessment would also be proportional and appropriate. Financial viability and national standards would be determined on a company and site basis, as appropriate. Prices would be determined on a regional basis and the Drinking Water Inspectorate would ensure water quality standards on a site specific basis. This would lower the costs of managing the regime and barriers to entry.

6.57 To ensure the proper allocation of costs, the system of connection charges would be updated to ensure that developers, incumbents and appointees pay their fair share of any necessary upstream reinforcement. To assist this and ensure non-discrimination, incumbents should publish a reference offer based on indicative prices and agreed price methodologies. Appointees should be able to challenge such an offer where they thought this was excessive.

6.58 Where appropriate, the supply price should also ensure that an efficient appointee is able to make a fair return whilst also contributing to the incumbent's wholesale costs. It is also important to be aware of the potential transfers between new and existing customers and the effects that inset appointments for new household customers can have on existing appointees, including the surplus from the lower cost of maintaining new customers' local infrastructure which contributes to reducing the maintenance costs of existing customers.

6.59 Inset customers should be no worse off than if they were served by the local incumbent over the long-term. In the case that an appointee proposes higher service or quality levels, the additional cost should be offset against the greater benefits. Competition has the potential if mismanaged to increase risks to public health and damage consumer confidence. To ensure quality standards, the Drinking Water Inspectorate would be given the powers to check the operational competency of alternative suppliers before appointment and subsequently, as currently is the case for the water supply licensing regime.

6.60 Finally, to support efficient entry and maximise benefits to consumers inset appointees would be able to determine those services that they would provide and be regulated accordingly. Other companies would be able to provide retail or upstream services through the new upstream or retail licences proposed as part of the wider reform to the regulatory regime. Under such a model, the appointee would take responsibility for those services it supplied, subject to a supplier of last resort obligation. Where another organisation provided retail, water and wastewater services, they would take responsibility for testing the wholesomeness of the water supply and preparing the water resource management plan. The unserved criterion, whose unclear legal definition currently restricts the scope of inset appointments, could also be clarified to allow privately-supplied sites and new developments to benefit from new appointees' services more easily. This could then be kept under review.

Replacement model

6.61 Under the replacement model, the current system of undertakers and inset appointments would be replaced by a new upstream competition framework. Under the proposals in chapter

four, a new contracting entity could become responsible for procuring water and wastewater services and infrastructure at lowest cost and providing them to retailers.

6.62 Such an approach would address the barriers raised above by allowing current appointees to compete not only for the provision of water and wastewater, infrastructure and retail services within potential inset appointments but also within incumbents' current geographical monopolies. This would allow alternative suppliers to deliver benefits to customers and the environment more widely. By providing services to, and buying services from, a central entity, such an approach would also respond to many of the concerns detailed above.

Abolition

6.63 Under the abolition approach, the current system of inset appointments would be abolished.

Costs and benefits

Benefits

6.64 I would expect the reform model to deliver benefits compared with the status quo by encouraging entry by inset appointees where this was efficient and in customers' interests. No customer of an inset appointee could be worse off. A number of inset appointees already offer reductions off the local incumbent's tariff of between five and 13 per cent. By way of illustration, if an inset appointee reduced costs by five per cent through efficiency gains, then the average household customer would save £15 a year.

6.65 There could also be additional benefits from any savings the appointee was able to secure from the local incumbent from the more efficient or innovative development of existing infrastructure. In some cases this can avoid the need to upgrade network infrastructure and water or wastewater treatment works, these savings could be in the order of £10 million for a development of several thousand homes.

6.66 While it is difficult to estimate the potential number of appointments, discussions with potential appointees suggest the changes above would encourage a significant increase in appointments. In the gas industry, for example, alternative suppliers account for two thirds of all new connections. Assuming a long-term supply of around 180,000 new houses a year, this implies insets could account for around 120,000 connections a year in the long-term.

6.67 In addition, service levels may rise if inset appointees agree to meet higher standards or negotiate more effectively with the network and network operator. A number of appointees offer "best of the best" service levels matching the highest standards offered by any incumbent. Where inset appointees offer alternative water and wastewater supplies there could also be environmental benefits from sustainable drainage, water re-use and less intensive treatment methods.

6.68 There may also be spillovers for existing customers if best-practice were adopted more widely. For example, a five per cent reduction in incumbents' last-mile infrastructure maintenance costs would reduce incumbents' costs by £60 million a year.

6.69 The aggregate benefits of the replacement model would be as set out in chapter four.

6.70 The benefit of the abolition model would be simpler regulation. However, from discussions with Ofwat and the Drinking Water Inspectorate, the savings would not be material. Companies may also make small savings from not supporting further applications, though again these would not be significant.

6.71 This analysis suggests that, all other things being equal, abolition, then reform and then replacement would deliver the greatest impact on costs and service, quality and environmental standards.

Costs

6.72 Introducing and supporting these models may also have costs compared to the status quo through impacts on existing customers' bills and increased regulatory costs.

6.73 Under the reform model, there may be additional regulatory costs. Discussions with Ofwat suggest the costs of creating such a framework would not be material. Furthermore, I would expect this to be at least partly recovered through lower processing costs for future applications. The increased need for oversight by Ofwat and the Drinking Water Inspectorate would be proportional to the number of applications. This could be of the order of £2 million a year over the medium-term.

6.74 The aggregate costs of the replacement model would be as set out in chapter four.

6.75 The costs of the abolition model would be the loss of any benefits to potential appointee customers. On the basis of 10 appointments a year serving 1000 homes and achieving a five per cent reduction in costs, this would result in total increase in costs to customers of a cumulative £150,000 a year.

Other outcomes

6.76 All of the scenarios above would enhance the Drinking Water Inspectorate's ability to ensure the wholesomeness of the public water supply. The reform and replacement models could also increase customer choice.

Summary

6.77 The models above could have the following discounted net present values over 30 years:

- reform - £300 million.
- replacement - £2.5 billion to £5.3 billion, including wider reforms; and
- abolition – a cost of £50 million.

In addition they may deliver a range of non-monetised benefits including more choice, improved service levels, higher quality outputs and environmental benefits.

Evaluation

6.78 On the basis of the evidence above, I believe there are potential benefits from the reform of the inset regime and inset appointees should use their appointments to deliver real benefits to customers and the environment. The current framework does not ensure that new inset appointments benefit customers and the environment because of the complexity of the process, the lack of clarity about the distribution and level of charges and payments, the absence of choice and potential impact on quality, service and environmental standards. I therefore welcome Ofwat's recent work in this area.

6.79 Consistent with the step-by-step approach set out in the introduction, as an initial measure, I would support the reform of the regime. Such a change would have very little cost, mainly in increased regulatory supervision and would ensure the efficient entry of new companies where this was in customers' and the environment's interests. While it is difficult to know the scale of these benefits, on the basis of discussions with stakeholders, they could be of

the order of £300 million. Such entry could also support improved performance across the industry, although this hasn't been quantified.

6.80 In the longer term, greater gains are likely to be achieved through the integration of the inset regime into a reformed framework for upstream competition. While the abolition model would result in a very small reduction in costs, it would also reduce the scope for alternative suppliers to bring innovative infrastructure and upstream solutions to the industry. I do not believe this would be in the best interests of either customers or the environment.

6.81 As discussed in chapter four, the relative efficiency of companies, and therefore the prices they charge to customers, varies across England and Wales. To the extent that the reforms above encourage efficient entry by alternative providers, these will be to consumers benefit, whether they are in England or Wales.

Recommendations

6.82 In the medium-term I support the replacement of the inset appointment framework with a reformed system for the provision of upstream and infrastructure services. In the interim, however, the Review recommends:

- the introduction of a framework of access setting out the expectations on incumbents and appointees to support the appointment process. This should be binding on all market participants;
- further streamlining the approval process for new appointments by adopting appropriate regulation: with financial viability determined at both a company and site level as appropriate, standards and prices at a regional level and supply requirements at a site level;
- updating the system of developer and water company charges and payments so that developers, appointees and incumbents pay an appropriate share for connection to the network. To ensure non-discrimination, incumbents should offer reference prices based on indicative costs;
- allowing companies to specialise in the provision of upstream, infrastructure or retail services, subject to a last resort obligation;
- clarifying the unserved requirement. The need for such a requirement should be reviewed periodically;
- the introduction of binding common codes and systems for supply to reduce barriers to entry;
- reforming the system of supply prices so that an efficient appointee is able to make a fair return whilst also contributing to the local incumbent's supply costs. The supply price should also recognise any structural differences in incumbent's and appointee's costs;
- customer should be no worse off than if they were served by the local incumbent over the long-term; and
- Ensuring the Drinking Water Inspectorate has the powers to check the operational competency of alternative suppliers before appointment, as currently is the case for the water supply licensing regime.

7 Innovative capacity

Introduction

7.1 In line with the Review's terms of reference, this chapter considers the case for enhancing the water companies' innovative capacity. This would increase the industry's ability to respond to the existing challenges of increasing efficiency, rising customer expectations and achieving higher environmental standards. It would also help the sector to meet the new challenges of climate change and population growth. This is particularly important as in a time of change, it is the industry, rather than the supply chain, that must drive the future direction of the sector. Such an approach is designed to complement the recommendations for increasing innovation set out elsewhere in this report.

Current situation

7.2 While it is very difficult to determine levels and rates of innovation directly, analysis of research and development spending, patent activity and productivity data, can provide a proxy for such activity.

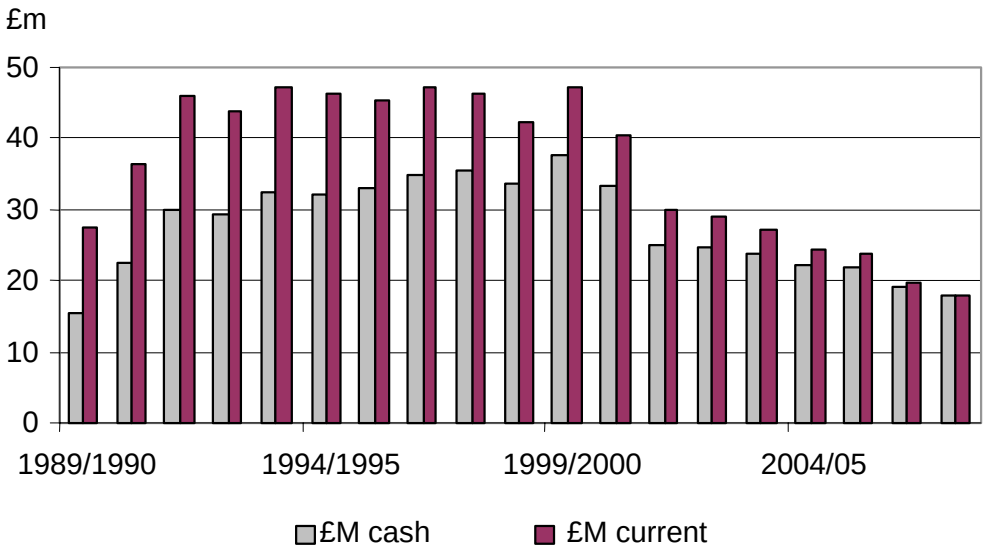
7.3 As described in chapter four, under the current system of economic regulation, companies can secure between 30 to 40 per cent of the net present value of any capital expenditure innovation and normally less than this for an operating expenditure innovation, but will have to meet the full cost of any failed innovation and the remedies required to meet quality standards or efficiency assumptions.

Research and development expenditure

7.4 Water companies fund research and development out of either operating expenditure or capital expenditure. For companies that carry out research and development from operating expenditure, such spending is considered alongside other operating expenditure priorities and is subject to the same efficiency assumptions and comparisons.

7.5 While the level of spending on research and development doesn't capture the quality of expenditure, it does provide a useful indicator of the volume of spending. In real terms, the amount of reported operational expenditure on research and development has fallen from £45 million a year in the early 1990s, to £18 million today.

Chart 7.A: Research and development spending by water companies. Data excludes water only companies



7.6 In addition, a proportion of spending on research and development in the sector also comes out of companies' capital budgets. Such an approach can help to link research and development with capital investment, but also has its limitations. For example, it inhibits investment in research which is not directed at a specific target or application. It also prevents market research and does not take full account of the costs associated with the protection of intellectual property.

7.7 Industry expenditure on research and development could be relatively low in comparison with other utilities in both the UK and abroad. International data providing sufficient comparison relating to research and development by water sector was unavailable to the Review. However, by looking at the combined gas, water and multi-utilities sector, the Department of Universities, Innovation and Skills found that in the UK research and development spending and multi-utilities sector was 0.29 per cent of turnover. This is roughly 40 per cent below the worldwide average for gas, water and multi-utilities of 0.49 per cent. It is also considerably below the UK national average level of research and development spend for all industries, which is 1.7 per cent.[1]

7.8 Aside from internal research and development, water companies carry out a further £4 million of collective policy-related research through UK Water Industry Research. In addition, research councils undertake basic research and venture capital sometimes supports suppliers in development.

7.9 In contrast to other fields, the water industry receives little Government support for research and development, when compared with other regulated sectors. As the Council for Science and Technology report notes:

1 Department for Innovation, Universities and Skills & Department for Business, Enterprise and Regulatory Reform, The 2008 R&D Scoreboard, 2009, pp 19-30.

There is a real contrast between the funding Government provides for research and development to energy companies operating in competitive markets through bodies such as the Carbon Trust, the Energy Savings Trust and Energy Technologies Institute.[2]

Box 7.A: The Carbon Trust

The Carbon Trust is an independent company set up by Government in 2001 as part of the Climate Change Levy package. Carbon Trust is a private company, limited by guarantee and receives funding from Department for Energy and Climate Change and, via separate relationships, the Devolved Administrations. The Department for Energy and Climate Change provided the Carbon Trust with around £90 million in 2008-09: Previously, Defra had provided the Trust with around £375 million over the period 2001-02 to 2007-08.

The Carbon Trust supports industrial research and experimental development in both the public and private sectors. Any UK business, university, public sector or voluntary organisation may apply for a grant of up to a maximum of £500,000 and a maximum of 60 per cent of eligible project costs. Project costs that are eligible for match funding for research activity including: personnel costs; instruments, equipment, land and premises, additional operating expenditure and other overheads incurred. Funding is also available for patenting costs and the purchase of services.

Patent activity

7.10 The Organisation of Economic Co-operation and Development researched filed patent applications in the water and wastewater industry, on behalf of the Review. Germany and the United States were found to be the most active countries in patent applications in the water and wastewater industry, with 1578 and 1038 registrations between 1999 and 2008 registered in the European Patent Office. The UK, with 323 patents, was fifth out of the G7 countries, plus Australia and Spain. These numbers give an indication of the innovation environment within these countries, however the patent applications registered in individual country's patent office by foreign inventors (as a proxy for the foreseen demand in those countries for innovative ideas) shows that, again, Germany and the United States are well ahead with 3547 and 7982 applications respectively, but the UK is third with 1077 applications.

7.11 Together these figures would indicate that while the UK attracts a relatively high level of interest from 'inventors' as measured by the number of patents registered in the UK patent office, it is relatively poor at encouraging 'inventors' particularly in seeking potential markets outside the UK.

Productivity growth

7.12 Studies of the efficiency improvement of the England and Wales water sector since privatisation show mixed results. One study decomposed total factor productivity in to technical change (which captures improvements in best practice), efficiency (the degree to which firms achieve best practice) and scale effects.[3] In the period from 1990 to 2000, they find a significant degree of technical change, combined with deteriorating efficiency and adverse effects from scale. Together, these yield a significant growth in total factor productivity. Another study, of which the reviewer is an author, notes that a significant change in the configuration of inputs

2 Council for Science and Technology: Innovation in the water industry: A Review by the Council for Science and Technology, 2009, viewed on 26 March 2009, <http://www2.cst.gov.uk/cst/reports/files/water.pdf>

3 D S Saal, D Parker, T Weyman-Jones: "Determining the contribution of technical change, efficiency change and scale change to productivity growth in the privatised English and Welsh water and sewerage industry: 1985-2000", Journal of Productivity Analysis. Vol 28 (1-2), 2007, pp 127-139.

occurred in the sector between 1993 and 2005, as previously scarce capital replaced labour, but that improvements in pure technical efficiency were almost entirely confined to the period following the more rigorous 1999 price cap.[4]

Result

7.13 It is very difficult to accurately measure innovation within the sector and I am aware of the limitations of the data relating to research and development expenditure, filed patents and productivity growth. However, collectively, they do help to provide some indication of the overall level of innovative activity in the industry, and the evidence suggests that the water sector in the UK is not performing as well as it might. Indeed, this view is shared by the Council for Science and Technology, who argue that "investment in research and development is low for the sector generally."[5]

7.14 Research commissioned for the Review found that a few companies characterised themselves as second-adopters of innovation, aiming to adopt innovations first tested or implemented by other organisations. Interestingly, the remaining companies did not refer to themselves explicitly as first-adopters or otherwise.

7.15 However, it is important to note that, nonetheless, water and sewerage companies identified research and development as an important driver of their business. Within this commonality, there is variability in the process for generating new ideas. Many companies carry out this process formally, through different means, including intranet- based ideas forums, project assessments of costs and benefits of proposed innovations, staff away days and staff appraisals. Other companies are less formal in approach, with employees first suggesting innovative techniques to line managers, who then forward ideas to the relevant part of the business.[6]

7.16 Although it appears that companies do have some mechanisms in place to facilitate innovation, it is difficult to measure both the quantity and the quality of ideas being generated. However, I have concluded that, given the current system of economic regulation, innovation tends to be incremental, rather than the kind step-change innovation the industry needs to meet the future challenges of climate change and demographic change. I believe there is also insufficient joined-up thinking and a lack of critical mass for research. These are industry problems that need to be addressed, for as the Council for Science and Technology argues:

> *There is a risk that continued low levels of R&D intensity will lead to limited scope for productivity gains in the future once today's practices and technological developments are incorporated by water companies. It could also mean that water technologies developed elsewhere will not be adopted in the UK due to higher costs of appropriation as a result of under-investment in the water sector's R&D base*.[7]

7.17 Meanwhile, following an examination of the innovation supply chain, research for UK Water Industry Research concluded:

> *There is misalignment of expectations between the supply-chain, the water companies, the regulators and government which is limiting the sector's ability to fully exploit its*

4 F Erbetta, M Cave, "Regulation and Efficiency Incentives: Evidence from the England and Wales Water and Sewerage Industry", Review of Network Economics. Vol.6 (4), 2007 pp 425-452, viewed on 10 March 2009, <http://www.rnejournal.com/artman2/uploads/1/erbetta_et_al_RNE_dec07.pdf>

5 Council for Science and Technology: Innovation in the water industry: A Review by the Council for Science and Technology, 2009, viewed on 26 March 2009, <http://www2.cst.gov.uk/cst/reports/files/water.pdf>

6 London Economics: Innovation in England and Wales, 2009, paragraph 5.1.1

7 Council for Science and Technology Innovation in the water industry: A Review by the Council for Science and Technology, 2009, viewed on 26 March 2009, <http://www2.cst.gov.uk/cst/reports/files/water.pdf>

capacity for technological innovation to sustainably meet the future needs and challenges of UK and world markets. [8]

7.18 The misalignment of expectations means there is a tendency for research and development projects to tail off at various points within the process, as initial research is not well-targeted towards what industry wants. Furthermore, the funding process across the whole value chain – from laboratory to implementation – is also misaligned. The most significant problem area seems to be between small-scale pilots and large-scale implementation.

Interim report emerging findings

7.19 The interim report found that there may be a case for more coordinated support for early stage public good research and development. Ofwat could agree a collaborative fund to address agreed priorities as part of the periodic review process. The Technology Strategy Board could support such an approach in England and Wales.

Responses to the interim report

7.20 The interim report asked for stakeholders views on how any market failure in basic public good research and development should be addressed.

7.21 Thames Water, echoing many others, argued that regulatory and incentives barriers existent in the current regime were important contributory factors to the decline in research and development.

7.22 Many stakeholders supported establishing a collaborative research and development programme. For example, UK Water Industry Research proposed establishing a research and development programme akin to Ofgem's Innovation Funding Initiative. UK Water Industry Research added that such a scheme in water could generate a significant research fund which could be matched with similar funds from the Technology Strategy Board, in order to create a national programme of research, development and application. These activities would be linked to the strategic plans of the research councils.

7.23 Severn Trent suggested that companies could put ideas to tender and if a bid was successful, the bidder would receive funding to pilot the study. Although supportive in principle, Yorkshire Water emphasised that it was not always possible to achieve a consensus with such an approach. Others, such as Northumbrian Water, preferred for companies to be given scope to invest in research as they wished, allowing a diversity of approach across the sector.

7.24 Ofwat noted that the characteristics of early stage research and development as a public good applies to all sectors of the economy. In partnership with the Technology Strategy Board, Ofwat have begun discussions with stakeholders about the possible development of an innovation platform. Innovation platforms funds are intended to be available to all and not just the incumbent water companies.

Options for reform

7.25 To meet these challenges, I have considered two broad approaches for supporting innovative capacity: a national collaborative model and a local model. I do not consider these models to be mutually exclusive and a final approach could adopt elements of each, or both programmes could run alongside each other. Either model could be ring-fenced and excluded from Ofwat's operating expenditure efficiency comparisons.

8 UK Water Industry Research: Barriers to Innovation in the UK Water Industry 2006, pp 59-60

National model

Under a national model, stakeholders could form a national research and development organisation. This would bring together the research councils, the Technology Strategy Board, suppliers, water companies, regulators and the UK and Welsh Assembly Governments, and could work to create a shared research and development strategy and innovation chain for the sector from basic research to implementation. Funding for research projects would be awarded on a competitive, matched-funding basis by a panel of experts from across the innovation chain to support the shared strategy.

This research and development spend should be driven by the need to deliver real benefits to consumers and should not divert the current research spend made by the industry, the Consumer Council for Water, Ofwat and other primary shareholders. The fund would be open to all organisations and water companies and they would be able to recover up to half their subscription from customers. Initially, the collaborative research and development fund could be to the order of £20 million per year, - at a cost of around 50 pence a year per customer. Water companies would be able to provide additional matched funding directly in support of research and development.

7.26 Any profits from patents or licences would be returned to members according to their subscription, and in the case of water companies who had recovered their subscriptions from customers, this would be in proportion to customers' contributions. In the first instance, the fund should be established for 10 years.

Box 7.B: Catalysing innovation

The Technology Strategy Board is an executive non-departmental public body sponsored by the Department for Innovation, Universities and Skills. It aims to promote research and development and the take up of science and technology across all sectors in UK. It has a budget of £1 billion over the next three years.

The Environmental Knowledge Transfer Network is sponsored by the Technology Strategy Board to help improve the competitiveness of UK environmental industries by:

- catalysing innovation;
- enhancing the uptake of technologies;
- improving knowledge transfer; and
- informing Government policy.

To stimulate innovation, the Environmental Knowledge Transfer Network develops business cases within key priority areas. Stakeholders determine short, medium and long-term opportunities and barriers, examining potential market drivers, gaps in technology and research and development priorities.

The Environmental Knowledge Transfer Network then facilitates activities, including a Technology Advisory Group, which generates projects, commercialisation activities and collaborative partnerships to address these innovation challenges. Examples of projects include:

An academic institute transferring nanotechnology employed in the contaminated land arena to be utilised in low-energy wastewater treatment funded by the Engineering and Physical Sciences Research Council;

A group of academics and water industry people identifying concerns over conflicting regulations in the water industry and their socio-economic impacts. The Environmental Knowledge Transfer Network aims to establish a Special Interest Group within this area, funded by the Technology Strategy Board.

Local model

7.27 Under a local model, stakeholders could determine those areas eligible for support, and Ofwat could allow companies to recover 50 per cent of the cost of research and development that met these criteria from customers up to a maximum of 0.2 per cent of turnover. Companies would be free to sub-contract such research and development or work collaboratively. In the first instance, the fund could last 10 years.

Box 7.C: Ofgem's Innovation Funding Initiative

In response to a sustained decline in investment in research and development by distribution network operators, Ofgem introduced the innovation funding incentive in 2005.[9] The principal objective of the initiative is to deliver benefits to consumers by enhancing network efficiency in operating costs and capital expenditure. The initiative allows companies to pass on 80 per cent of investment in eligible projects to customers, up to a maximum of 0.5 per cent of their combined distribution network revenue. Eligible projects are those designed to enhance the technical development of distribution networks, including: construction, commissioning, operation, maintenance and decommissioning. Operators report their activities on an annual basis to Ofgem.

In 2006-07, operators invested £9 million in projects, a research and development intensity of 0.27 per cent, almost one-third higher than in 2005-06, together with improved levels of collaboration between operators and industrial and academic partners. Ofgem is now considering the scope for extending the initiative to projects related to environmental issues. The net present value of current projects is estimated at £46 million and Ofgem have extended the initiative to the end of their fifth distribution price control review in 2015.

Costs and benefits

7.28 A national scheme offers the advantage of greater alignment across the innovation chain. This will help to reduce the funding and development gap that is currently in evidence. Further, it will enable the industry to develop innovations at the appropriate scale and avoid duplication or free riding. Key challenges like climate change and population growth are large-scale problems and there is greater likelihood of such challenges being met if there are sufficient resources to deliver a focused, collaborative effort.

7.29 However, under a national programme, the set up and management costs would be greater than a local scheme, due to the administration of a larger budget and the need to establish both a committee for agreeing common goals and a project approvals board. There is a also risk that a national scheme would be too rigid to adequately meet the needs of local concerns

7.30 A locally-based scheme would be administratively less complex than its national counterpart and would be focused on regional needs. However, by its very nature, the extent of the solutions would be small-scale and there is the real risk that similar research and development would be taking place elsewhere in another region, when arguably, combined resources would have provided a better outcome, offering greater value for money. Also, a local scheme does not protect against the free-rider problem.

Evaluation

7.31 There are significant weaknesses in the sector's current approach to research and development. There is a fundamental lack of alignment between the different elements of the innovation chain leading to misdirected research and development and low take up by water companies. There are only weak incentives to encourage companies to innovate. This is compounded by a lack of funding at key points of the innovation chain because of the risk profile of innovation in the water industry. De-risking funding is therefore critical.

9 Office of Gas and Electricty Markets: The innovation funding incentive and registered power zones annual reports 2007/08, 2009, viewed on 16 March 2009, <http://www.ofgem.gov.uk/Networks/Techn/NetwrkSupp/Innovat/ifi/Documents1/Web%20Text%20Innovation%20Funding.pdf>

Box 7.D: Conclusion of other reviews

Council for Science and Technology

Recommendation 1: Ofwat should make clear it will be looking to introduce performance assessments to reward water and sewerage companies in terms of improved social and environmental outcomes stemming from adoption of new technological solutions as part of delivering their business plans, by:

- requiring each company to have in place a technology plan as an integral component of their strategic plans for each five-year review process
- rewarding water and sewerage companies when they make the necessary longer-term R&D investments by extending the payback period, subject to agreed criteria being met
- allowing water companies to retain a greater proportion of the net present value of a successful cost-saving innovation

Recommendation 2: Ofwat should adopt incentives to stimulate and reward more research in the water sector. They should consider options such as ring-fencing a certain percentage of price control revenue for research, on a use-it-or-lose-it basis, as introduced by Ofgem to help stimulate more research in the energy sector

Recommendation 3: Government, together with Ofwat and the water companies, should put in place mechanisms to deliver a more co-ordinated approach on strategic, medium-longer term R&D in the water industry by:

- devising mechanisms to encourage the necessary structures for this research to be commissioned by and undertaken in partnership with the industry, for example by strengthening the resources UKWIR or a similar body
- setting up an Innovation Platform on Water Technologies through the Technology Strategy Board to identify mechanisms for continuing to drive up water quality standards whilst at the same time driving down the energy footprint
- devising mechanisms to incentivise water and sewerage companies to collaborate more and share information on leading-edge solutions, along the lines of the Dutch model, through a Knowledge Transfer Network for the water industry
- Water and sewerage companies themselves need to increase their collaboration and innovation

Recommendation 4: Government, through bodies such as the Energy Technologies Institute, needs to encourage development of low carbon technologies applicable to the water sector.[10]

All Parliamentary Party Water Group

"The group would like to see a similar approach to that in the energy sector to incentivising innovation...the sector must look to try and establish a common understanding of what kind of innovation is expected...which would also serve to reduce the risk levels of innovating."[11]

Commission on Environmental Markets and Economic Performance Report

"Government departments and regulatory agencies' science and innovation strategies...should address their role in inducing and rewarding private sector innovation that furthers the Government's environmental objectives."[12]

10 Council for Science and Technology: Innovation in the water industry: A Review by the Council for Science and Technology, 2009, viewed on 26 March 2009,

House of Lords Science & Technology Committee Report

"We recommend that OFWAT allocates to R&D a certain proportion of companies' turnover that would be exempt from the efficiency targets."[13]

7.32 Research in other sectors, suggests that investment in research and development may also be adversely affected by the extension of competition. A study of research and development efforts and innovation in the electricity sector found that efficiency gains in the short and medium term were at least partly offset lower rates of technological development because of reduced investment.[14]

7.33 In this context, I am concerned that a local model will not provide the scale, depth or level of coordination required to adequately meet the important challenges facing the industry. I recognise there is a need to support companies in meeting local or regional challenges, but I believe this is best achieved through the upstream reforms, as set out in chapter four. Although a national model will in all probability, be administratively more complex than a local model, I believe that provided common goals are correctly identified and supported by the sector as a whole, a national model offers the greatest benefit. Such an approach would have buy-in from key stakeholders, would align the innovation chain and ensure a co-ordinated approach to innovation.

7.34 I welcome the fact Ofwat and the Technology Strategy Board have begun discussions with other stakeholders about developing a water innovation platform. However, it should be recognised that this method of approach is only likely to be able to address barriers along that part of the innovation process addressed by the Technology Strategy Board. A broader programme will be required to achieve buy-in and alignment along the whole value innovation process.

7.35 I am concerned that Ofwat does not currently have the mandate to support such an approach, which could be seen to conflict with a short-term interpretation of protecting customers' interests. I therefore support the UK Government giving Ofwat a statutory duty to support innovation to allow it to actively encourage such activity particularly with regard to supporting innovation that will be in the long-term interests of consumers. I support Ofwat regularly reporting on its work to promote innovation to address the long-term challenges facing the water sector. Ofwat should publish a report on the measures taken to encourage innovation and their effects at least every five years.

Recommendations

7.36 The UK and Welsh Assembly Governments, the industry, regulators, suppliers, the research councils and the Technology Strategy Board and other stakeholders should come together to form a national water research and development body and agree a shared research and development vision for the industry. While priorities should be agreed by stakeholders, the Review has identified a number of areas which could be supported, including developing the evidence base around, and technology for, dynamic abstraction and discharge licensing. UK

<http://www2.cst.gov.uk/cst/reports/files/water.pdf>

11 All Party Parliamentary Water Group: The Future of the UK Water Sector, 2008 <http://www.water.org.uk/home/news/press-releases/appwg-sector-report/appwg---inquiry-report---the-futue-of-the-uk-water-sector---ormatted----1-april.pdf>

12 Commission on Environmental Market and Economic Performance: Report, 2007, Recommendation 6, viewed on 10 March 2009, <http://www.defra.gov.uk/environment/business/commission/pdf/cemep-report.pdf >

13 House of Lords: Select Committee on Science and Technology Eighth Report, paragraph 8.11, viewed on 10 March 2009, <http://www.publications.parliament.uk/pa/ld200506/ldselect/ldsctech/191/19112.htm>

14 T Jamasb, M Pollitt, "Liberalisation and R&D in network industries: the case of the electricity industry", Research Policy. 37, 2008. pp.995-1008.

Water Industry Research has also suggested that the industry could support research and development in underground asset maintenance, leakage, energy use, smart meters and water and wastewater treatment technologies.

7.37 To support this vision, I propose the creation of an industry research and development body. The body would be supported by funding, which could be of the order of £20 million a year, which would be allocated on a competitive basis to organisations undertaking basic research, development and trialling as appropriate. This should be in addition to current spending. The fund would be open to all organisations and water companies would be able to recover up to half their subscription from customers, at a cost of around 50 pence a year. Any profits from patents or licenses would be returned to members and, in the case of water companies, to customers and shareholders on an equal basis. In the first instance, the fund should be established for 10 years. Expenditure on research and development should be excluded from Ofwat's efficiency comparison tables.

7.38 To enable Ofwat to better support innovation in the industry, for example by taking forward the research and development board and other recommendations in this report, I propose that the regulator be given a statutory duty to promote innovation. This should further the interests of customers and the environment. Ofwat should also have a statutory duty to report to the UK and Welsh Assembly Governments every five years on the measures it has taken to support innovation and how effective these measures have been.

7.39 Such an approach would increase companies' capacity and competence to undertake and lead research and development and increase innovation levels in the industry.

8 Conclusions and recommendations

8.1 The industry has achieved a great deal over the last 20 years. In many respects the sector can already be considered a world leader and this must be recognised and applauded. However, the new challenges of climate change and population growth, together with the on-going challenges of increasing quality standards, meeting ever higher customer expectations and keeping prices down mean that the next 50 years will be very different from the past 20.

8.2 The aim of the Review has therefore been to recommend changes to the frameworks of the industry to deliver benefits to customers and the environment. I have not considered competition or innovation as ends in themselves but a means of improving services for customers, particularly the most vulnerable, and of protecting the environment. In this report, I have therefore recommended reforms to both the regulatory and legislative frameworks of the water sector to encourage the industry to become more innovative so that it is better able to anticipate, manage and respond to these challenges.

8.3 In doing so, I have been conscious of the lack of international experience of some of the changes proposed, their cumulative nature and the need for the necessary contributory factors to be in place. Consequently, I believe it is right to have adopted a step-by-step approach to reform, starting where the risk-reward ratio is most favourable. The UK and Welsh Assembly Governments and the UK Parliament and the Welsh Assembly can then review the costs and benefits of further change on the basis of experience to date.

8.4 Recognising the range of circumstances prevalent across England and Wales, including the varying nature of water and wastewater markets and company structures, I have also avoided a one-size-fits-all approach. The recommendations set out in this report should be applied flexibly, seeking to retain the benefits of the current framework as appropriate, while proposing changes where they will bring benefits to both customers and the environment.

8.5 Together, I believe that the recommendations set out below have the potential to create and support a world-class industry that will be able to respond effectively to the challenges and opportunities of the twenty first century. The net present value of a purchasing obligation, a reformed Water Supply Licensing regime, a modernised inset regime and retail competition could be £2.5 billion. There would also be significant non-monetised benefits including improved environmental outcomes and higher service and quality levels.

Table 8.A: Net present value of Review recommendations (£ million)

Recommendation	Net present value over 30 years (£ million)
Purchasing obligation	1,300
Reform to Water Supply Licensing regime	400
Inset modernisation	300
Retail competition	600
Source: Review calculations	

Recommendations

Recommendations that require legislation are in bold.

Abstraction and discharge (chapter three)

Recommendation one: **In those areas where licence levels are unsustainable, the Environment Agency should be permitted to run reverse auctions.** This would be initially on a pilot basis. **In those areas where negotiated agreements failed to reduce licence levels, a scarcity charge should be introduced on an administrative basis and increased over time until abstractions are sustainable. Legislation should be introduced to allow the Environment Agency's to increase abstraction charges beyond cost recovery.** When abstractions fall to a sustainable level, the charge would fall to zero.

Recommendation two: **The UK Government and Welsh Assembly Government should consider whether simplification of Section 52 of the Water Resource Act, for example by allowing the Environment Agency to make ex-gratia payments, can reduce unnecessary administrative costs whilst ensuring appropriate accountability of public funds.**

Recommendation three: In catchments where licence levels are sustainable, licences should be fully tradable subject only to modification for direct environmental impacts or impacts on other users from a change of use or location. The Review welcomes the work by Ofwat and the Environment Agency on reducing the barriers to trading and supports the provision of more information, improving the administrative process and giving traders more confidence about the rights licences signify. **To achieve this, legislation should enable the Environment Agency to collect and publish trade prices to provide greater information to traders about the potential value of licences.**

Recommendation four: In order to balance protecting the environment against competing extractive uses of water and to facilitate greater competition, I recommend that the Environment Agency should take forward a more risk based approach to allocating abstraction licences. This would consider the likelihood of allocated licences being under-utilised or utilised at different times. If an independent contracting organisation was introduced then incumbents could be relieved from the Supplier of Last Resort Duty. Until such time, the Environment Agency should make use of its existing regulatory powers to reallocate abstraction licences and also issue temporary licences to facilitate upstream competition.

Recommendation five: Discharge consent holders should be able to trade their discharge consents on a pollutant basis subject only to modification for direct environmental impacts from a change of location (for example, the benefits of greater discharge upstream). In addition, a pilot should be run to investigate the potential of trading between point source and diffuse emissions. Discharge consent conditions could also better reflect the impact of discharge on the environment. I would recommend further research, including pilots, to establish the costs and benefits of more flexible licensing conditions for example based on flow volumes and water quality conditions.

Upstream (chapter four)

Recommendation six: Consistent with a step-by-step approach I recommend reforming the current water supply licensing regime and supplementing it with a market-like framework as soon as is practicable. This will require:

- an obligation for incumbents to procure the best value combination of water, wastewater and infrastructure supplies as part of the regulatory process. Companies' decisions would be scrutinised by a procurement panel with independent members and would be subject to review by Ofwat in making its

periodic review determination and the Environment Agency in determining the management of water resources;

- unbundling the current combined supply licence and creating a new upstream licence for companies wishing to introduce raw or treated water into an incumbent's network or remove and treat wastewater or treat and dispose of sludge from it. There should also be a network licence for those looking to provide infrastructure. The current structure of licences for incumbents would remain as now;
- mandating the publication of water and wastewater supply costs at a water resource zone level and transport costs across their region based on a common methodology;
- for supplies to incumbents, replacing the costs principle with an ex-ante access pricing framework based on full economic costs. Access prices would be determined by Ofwat at a water resource zone level on a common methodology with reference to guidance from Defra and Welsh ministers. Such an approach 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.
- for supplies to retailers or large customers, replacing the costs principle with an ex-ante access pricing framework based on long-run avoidable costs. Access prices would be determined by Ofwat at a water resource zone level on a common methodology, with reference to guidance from Defra and Welsh ministers. Such an approach should ensure that:
    - an efficient network operator is able to cover their costs;
    - tariffs are non-discriminatory; and
    - efficient sources of supply are supported.
- introducing common operational codes and systems, binding on all market participants;
- creating powers for Ofwat to undertake proactive investigations of non-compliance; and
- ensuring that the Drinking Water Inspectorate has appropriate powers and resources to maintain the quality of, and confidence in, the wholesomeness of the water supply.

Recommendation seven: I welcome Ofwat's decision to introduce greater incentives for innovation through the capital expenditure incentive scheme, but believe it can be developed further. Companies should be given a greater efficiency incentive for significant and sustained outperformance. To introduce the same symmetry and incentives to, such an approach should also be applied to operating expenditure.

Recommendation eight: Ofwat should address the potential bias towards capital expenditure by adopting a company based capital-operating expenditure ratio assumption as part of the periodic review process.

Recommendation nine: To give the industry the confidence it needs to invest in new ways of working, the UK and Welsh Assembly Governments and regulators should agree clear objectives, including legislation and guidance, and communicate them in a timely fashion.

Recommendation 10: Ofwat should take forward these recommendations as part of their review of regulation, ahead of the process for setting prices from 2015.

Retail (chapter five)

Recommendation eleven: **On the basis of responses to the interim report, I now believe there may be practical benefits from abolishing the non-household threshold, rather than retaining a one megalitre threshold with aggregation, on the introduction accompanying measures.** However, given that the threshold is determined through secondary legislation, I recommend that nearer the time, Ofwat as part of its statutory duty to assess the state of the water markets, should advise the UK and Welsh Assembly Governments on whether abolishing the threshold remains appropriate, based on:

- research, lead by the Consumer Council for Water, on small non-household customers' views;
- experience gained from Scotland and, as appropriate, elsewhere;
- an assessment of the costs and benefits; and
- appropriate measures being put in place to protect vulnerable customers.

Recommendation twelve: **Legal separation should be mandatory except where, for smaller companies, such separation could lead to unavoidable and unacceptably large bill increases to customers that outweighed the monetary and non-monetary benefits of such separation.** Ofwat should advise government on whether a threshold is appropriate and if so, its level. In such cases, functional separation could remain appropriate.

Recommendation thirteen: The decision on whether and when to extend retail competition to other customers should be taken by the UK and Welsh Assembly Governments and the UK Parliament and the National Assembly for Wales on the basis of advice from Ofwat and other parties after consultation with stakeholders.

Recommendation fourteen: Such changes should be accompanied by negotiated settlements between the Consumer Council for Water, retailers, wholesalers and other stakeholders, initially to determine quality and service standards for wholesale supply. These should have significant weight in price limits of plus or minus three percent of turnover. It will be for retailers together with other stakeholders to negotiate the size of the settlement, whether it is symmetrical, and what service and quality improvements the local incumbent should deliver. As the economic regulator, Ofwat would remain responsible for agreeing and incorporating the results of such negotiations in price limits. I would expect such an approach to develop over time.

Recommendation fifteen: For those customers ineligible to choose their supplier, I recommend that there should be further negotiated settlements between customer representatives and monopoly retailers, initially to determine retail quality and service standards. Again, these should have potential weight in price limits of plus or minus three per cent of turnover and reflect local priorities. It will be for the Consumer Council for Water, together with other stakeholders, to negotiate the size of the settlement, whether it is symmetrical, and what service and quality improvements the local incumbent should deliver. As the economic regulator, Ofwat would remain responsible for agreeing and incorporating the results of such negotiations in price limits.

Industry structure (chapter six)

Recommendation sixteen: There are potentially significant economic and environmental benefits to be gained from mergers between water companies and, with appropriate safeguards, I believe these benefits can outweigh the loss of a number of the comparators. I therefore recommend:

- on the introduction of retail competition, removing retail only mergers from the special water merger regime altogether;
- raising the qualifying threshold for the special water merger regime to a maximum of £70 million and reforming the threshold so that it applies to the smallest company, as in the wider regime. The UK Government should then keep this threshold under review;
- Ofwat commissions an independent review of the scope for making greater use of alternative data sources and statistical techniques and their impact on the loss of a comparator and continues to refine its econometric modelling techniques to take advantage of the information from alternative data sources;
- Ofwat is given a statutory duty to develop and publish guidance on its approach to assessing the loss of a comparator after consultation with stakeholders. This should set out the criteria, weightings and methodology used in any future assessment.
- introducing a new first stage test. Based on its published guidance, Ofwat should provide specific advice on a merger to the Office of Fair Trading, including an assessment of the scale of any prejudice. The Office of Fair Trading should consider that advice, as well as any other competition effects arising from the merger and the scope for structural or behavioural remedies, when considering the need for referral to the Competition Commission; and
- The Government should review the success of the regime after five years.

Recommendation seventeen: In the medium-term I support the replacement of the inset appointment framework with a reformed system for the provision of upstream and infrastructure services. In the interim, however, the Review recommends:

- the introduction of a framework of access setting out the expectations on incumbents and appointees to support the appointment process. This should be binding on all market participants;
- further streamlining the approval process for new appointments by adopting appropriate regulation: with financial viability determined at both a company and site level as appropriate, standards and prices at a regional level and supply requirements at a site level;
- updating the system of developer and water company charges and payments so that developers, appointees and incumbents pay an appropriate share for connection to the network. To ensure non-discrimination, incumbents should offer reference prices based on indicative costs;
- allowing companies to specialise in the provision of upstream, infrastructure or retail services, subject to a last resort obligation;
- clarifying the unserved requirement. The need for such a requirement should be reviewed periodically;
- the introduction of binding common codes and systems for supply to reduce barriers to entry;

- reforming the system of supply prices so that an efficient appointee is able to make a fair return whilst also contributing to the local incumbent's supply costs. The supply price should also recognise any structural differences in incumbent's and appointee's costs;
- customer should be no worse off than if they were served by the local incumbent over the long-term; and
- Ensuring the Drinking Water Inspectorate has the powers to check the operational competency of alternative suppliers before appointment, as currently is the case for the water supply licensing regime.

Innovative capacity (chapter seven)

Recommendation eighteen: **The UK and Welsh Assembly Governments, the industry, regulators, suppliers, the research councils and the Technology Strategy Board and other stakeholders should come together to form a national water research and development body and agree a shared research and development vision for the industry.** While priorities should be agreed by stakeholders, the Review has identified a number of areas which could be supported, including developing the evidence base around, and technology for, dynamic abstraction and discharge licensing. UK Water Industry Research has also suggested that the industry could support research and development in underground asset maintenance, leakage, energy use, smart meters and water and wastewater treatment technologies.

Recommendation nineteen: To support this vision, I propose the creation of an industry research and development body. The body would be supported by funding, which could be of the order of £20 million a year, which would be allocated on a competitive basis to organisations undertaking basic research, development and trialling as appropriate. This should be in addition to current spending. The fund would be open to all organisations and water companies would be able to recover half their subscription from customers, at a cost of around 50 pence a year. Any profits from patents or licenses would be returned to members and, in the case of water companies, to customers and shareholders on an equal basis. In the first instance, the fund should be established for 10 years. Expenditure on research and development should be excluded from Ofwat's efficiency comparison tables.

Recommendation twenty: To enable Ofwat to better support innovation in the industry, for example by taking forward the research and development board and other recommendations in this report, I propose that the regulator be given a statutory duty to promote innovation. This should further the interests of customers and the environment. Ofwat should also have a statutory duty to report to the UK and Welsh Assembly Governments every five years on the measures it has taken to support innovation and how effective these measures have been.

Table 8.B: Indicative timetable for reform. Actual dates will depend on acceptance of recommendations and legislative and periodic review timetable.

Number	Recommendation	2010	2015	2020
Abstraction and discharge (chapter three)				
R3/5	Barriers to trading removed	2010		
R4	Risk based approach to licensing	2010		
R4	Greater use of existing powers to reallocate licences	2010		

R5	Discharge consent condition research	2010			
G1	Reverse Auctions Pilots	2012			
G1	Administrative Prices Rise	2012			
G2	Section 52	2012			
	Full licence trading		2015+		
	Abstraction licences time limited				2020+
Upstream (chapter four)					
G6	Greater information provision	2010			
R/G9	Clear and timely objectives	2010			
R/G9	Clear and timely objectives	2010			
R/G9	Clear and timely objectives	2010			
G6	Reform of upstream access price	2012			
G6	New upstream and network licences	2012			
R6	National codes and systems	2012			
R6	Economic purchasing obligation		2015		
R7	Innovation incentives		2015		
R8	Capital/ operational expenditure assumption		2015		
	Contracting entity		2015+		
Retail (chapter five)					
Interim	Lower non-household threshold to 5 megalitres	As soon as practicable			
G11	Abolish non-household threshold	2012			
Interim	Extension to wastewater	2012			
Interim	Reform of retail access price	2012			

G12	Retail legal separation for companies above de-minimis level	2012
Interim	Self-supply licence	2012
Interim	National codes and systems	2012
G13	Possible extension to households	2014+
R14/15	Negotiated Settlements	2015
Industry structure (chapter six)		
G16	Raise special merger threshold to £70 million	2010
R16	Review of data and statistical techniques	2010
R16	Published prejudice assessment guidance	2010
R16	Binding inset access and supply framework	2010
R16	Streamline approval process	2010
R16	Update supply and connection charges and payments	2010
R16	Unbundling inset licence	2010
R16	Clarify unserved requirement	2010
G16	Remove retail only mergers from special merger regime	2012
G16	Threshold applies to smaller company	2012
R16	Customers no worse off over long-term	2012
G16	Drinking Water Inspectorate powers	2012
Innovative capacity (chapter seven)		
G/R18	Research and development body	2010
G/R19	Research and development fund	2010

G20	Ofwat innovation duty	2012

Source: Review

A Upstream cost-benefit analysis

Executive Summary

A.1 This annex focuses on the costs and benefits of further competition in upstream water and wastewater services. A range of scenarios are considered and compared against a status quo scenario.

A.2 The approach uses a standard cost-benefit analysis methodology, and discounts benefits and costs over a 30 year horizon. The following benefits and costs have been quantified in monetary terms:

Table 8.C: Table

Benefits	Costs
Productive Efficiencies	Regulatory costs
Dynamic Efficiencies	Incumbents' administration costs
Resource optimisation	Incumbents' financing costs
	Market set-up and maintenance costs

Non-monetised costs and benefits are discussed in chapter four.

Results

A.3 The following scenarios have been modelled:

- Scenario one is the status quo.
- Scenario two supplements the current framework with an economic purchasing obligation on incumbents.
- Scenario three replaces the current framework with an incremental competition for the market contracting entity (the independent procurement entity from the interim report).
- Scenario four replaces the current framework with a competition for the market contracting entity for the whole market.
- Scenario five supplements the current framework with a limited competition in the market framework (a reformed water supply licensing regime).
- Scenario six replaces the current framework with a broad competition in the market entity (the gross mandatory pool or bilateral market from the interim report).
- Scenario A assumes that the cost of capital rises by 100 basis points for competition for the market scenarios and 400 basis points for competition in the market scenarios.

- Scenario B assumes that the cost of capital rises by 60 basis points for competition for the market scenarios and 250 basis points for competition in the market scenarios.
- Scenario C assumes that the cost of capital rises by 30 basis points for competition for the market scenarios and 100 basis points for competition in the market scenarios.

The additional costs of de-gearing by highly geared companies could be of the order of £4 billion.

These are set against baseline costs of around £160 billion over 30 years.

Table A.1: Difference in net present value of different scenarios compared to status quo over 30 years (£ billion)

Model/NPV £ billion	High	Medium	Low
Market-like	1.3	1.3	1.3
For the market (incremental)	2.8	4.2	5.3
For the market (broad)	-1.9	1.1	3.4
In the market (WSL)	-0.1	0.4	1.0
In the market (broad)	-23.0	-12.2	-1.5

Source: Review calculations

A.4 In deriving an aggregate net-present value, no distinction has been made based upon where the costs and benefits initially fall. However, it is assumed that after a transitional period any costs and benefits will be largely passed to the consumer.

I: Introduction

A.5 This annex focuses on the cost-benefit analysis for further upstream (resource, treatment and infrastructure) competition. A range of scenarios are considered and compared against the status quo. Costs and benefits are discussed more widely in chapter four, which also sets out the rationale for potential reform.

A.6 While forms of upstream competition have been introduced in other countries and industries, there remains uncertainty about how and when markets will evolve, who is most likely to participate and who has most to gain. There is also uncertainty over the degree to which competition will drive productive and dynamic efficiencies and optimisation over time. These issues will be discussed, where appropriate, in the rest of this annex. Uncertainties about the costs and benefits of upstream competition are addressed explicitly through a risk assessment and sensitivity analysis.

A.7 Some costs and benefits are easier to quantify than others. For example, costs of implementation and cost efficiencies can easily be expressed in monetary terms, but factors such as the benefits of better tailoring services to needs are less so. Impacts that aren't quantified are considered as part of the policy proposals in chapter four and weighed against the monetised impacts.

A.8 The scenarios presented are intended to be illustrative. They are not mutually exclusive, and the speed, scope and scale of their introduction could vary. Models could also be introduced cumulatively or in combination. Offsetting regulatory action by Ofwat to manage risks and maximise benefits could ameliorate any negative impacts. For simplicity, the scenarios are

presented separately and on the basis of complete and immediate introduction. The uncertainties are even greater in the case of more extensive models. Decisions on whether to proceed with such models would require further analysis on the basis of greater information and experience.

A.9 This annex is structured as follows: in Part II the scenarios are defined; in Part III, the potential scope for competition is set out; in Part IV, the approach to benefits is discussed and in Part V, the approach to costs. In Part VI, other details about the approach to the costs-benefit are discussed, such as distributional issues and discounting; Part VII sets out a risk assessment; in Part VIII, results and sensitivity analysis are presented, and finally the results are discussed in Part IX.

II. Definition of Policy Scenarios

A.10 The following scenarios for the extension of upstream competition have been considered:

- Scenario one: This is the 'business as usual' approach and assumes that the current legislative and regulatory frameworks remain in place. The cost-benefit analysis for the other scenarios is evaluated in comparison to this scenario. Therefore, no costs and benefits are calculated for this scenario and the costs and benefits presented for the other scenarios are compared to this status quo scenario.
- Scenario two: The current legislative and regulatory frameworks are supplemented by an economic purchasing obligation and accompanying changes to increase transparency.
- Scenario three: The current framework is replaced by an incremental competition for the market contracting entity that contracts for water and wastewater services at best value and then sells these services to retailers (the independent procurement entity from the interim report).
- Scenario four: The current framework is replaced by a competition for the market contracting entity for the whole market that contracts for water and wastewater services at best value and then sells these services to retailers.
- Scenario five: The current framework is supplemented by a limited competition in the market framework where retailers can contract with both the local incumbent and other suppliers for supply of water and wastewater services (a reformed water supply licensing regime).
- Scenario six: The current framework is replaced by a competition in the market framework where retailers' contract with suppliers for supply of all water and wastewater services directly (a bilateral market) or via an intermediary (a mandatory pool).

III: Scope for Competition

8.6 The table below shows the size of the upstream market in England and Wales. The expenditure estimates are from companies' draft business plans and from estimates of spending by area from companies' regulatory accounts. The estimate of regulatory capital value are allocated on the basis of net modern equivalent asset values estimated by consultants on behalf of the water companies and are then rolled forward from companies' regulatory accounts on the basis of current capital expenditure levels and depreciation. [1] The consultants' estimates

1 Ofwat: Financial Performance and expenditure of the water companies in England and Wales 2007-08.Tables 17 and 21 pages 26 and 32, 2008
www.ofwat.gov.uk/regulating/reporting/rpt_fpr_2007-08.pdf and Ofwat (2008): Setting price limits for 2010-2015: overview of companies' draft business plans 2008. Birmingham: Ofwat.

show that alternative methodologies are possible and would give significantly different results. Replacement rates are estimated on the basis of June return data and discussions with stakeholders. [2]

Table A.2: Size of upstream market

£m a year	Resources	Treatment	Infrastructure
Capital expenditure			
Maintenance	100	1,100	1,500
New	900	1,000	400
Operating expenditure			
Existing	300	1,500	1,100
New	100	100	0
Approximate regulatory capital value			
	2,700	6,000	41,200
Approximate replacement rates			
	1%	3%	1%
Sources: Ofwat, NERA, Stakeholder discussions			

A.11 Some models competition more widely along the value chain, across markets, and across assets. The actual scope for competition will depend on a number of factors, such as:

- the costs for upstream services;
- the access price framework;
- the size of the market, which can allow economies of scale for any entrant;
- real or perceived price or non-price discrimination;
- the saving required to gain market share to, and therefore the level of efficiency compared to the incumbent (or so-called "super-efficiency") required;
- the rate at which downstream buyers engage with the competitive market;
- the potential for entrants to exploit competitive advantages; and
- the scope for entrants to offer higher service levels and standards than the incumbent.

IV: Benefits

A.12 This section examines the scale of potential benefits to be used in the cost-benefit analysis of each scenario. Benefits can arise from productivity-driven cost savings, better allocation of inputs, service improvements, displacing other costs and impacts on the environment.

Productive Efficiency

A.13 Competition can result in productive efficiency gains in both operating and capital expenditure as more efficient firms gain market share for the provision and operation of

Table 4 page 14. http://www.ofwat.gov.uk/pricereview/pr09phase2/pr09phase2pubs/sub_bpd_pr09summary.pdf Ibid: Table 9 page 15.

http://www.ofwat.gov.uk/regulating/reporting/rpt_fpr_2007-08.pdf National Economic Research Associates Financial Implication of Competition Models Water UK. Figure 5.1 table 31, 2009

2 Ofwat: June return data <http://www.ofwat.gov.uk/regulating/junereturn/jrlatestdata/>

resources, treatment and infrastructure assets from less efficient firms. Currently, the differences between the average capital and operating expenditure efficiency of incumbents and the frontier company are 12 per cent and 10 per cent respectively.[3] Shifting to the industry frontier would therefore result in significant productive efficiency gains. Such a view is supported by academic evidence of the efficiency of water and wastewater companies in England and Wales. For example, Saal and Parke find that the average level of inefficiency in 2000 was 5.1 per cent.[4] Other research suggests overall inefficiency of roughly 13 per cent.[5] To the extent that the industry is not at the production possibility frontier, there may be further gains from further competition. For the purposes of the cost-benefit analysis, the following reductions in the differences in efficiency have been assumed for the relevant capacity:

Table A.3: Proportion of productive efficiency differential (per cent) eliminated in different scenarios

Per cent improvement	Capital and operating expenditure
Scenario two	20
Scenario three	100
Scenario four	100
Scenario five	20
Scenario six	100

Source: Review

A.14 There will also be productive efficiency gains from better resource optimisation. Work by the Environment Agency on behalf of the Water Resources in the South-East Group claims that greater optimisation could increase yield from existing resources by two per cent or more and reduce the need for new resources by 20 per cent.[6] The introduction of the south-east Queensland Water Grid Manager led to a 14 per cent increase in yield from resources.[7] Assumed savings of two per cent have been applied to existing capacity, 7.5 per cent for replacement capacity and 15 per cent for new capacity in the case of scenarios three, four and six and five per cent for new resources. In scenarios two and five, efficiency is assumed to have increased by three per cent for new capacity only.

Dynamic Efficiencies

A.15 The interim report discussed the strong body of evidence showing that competition enhances productivity.[8] These studies highlight the importance of product market competition, and how the present system of comparative competition is unlikely to drive productivity to the same degree (for example, because 'external restructuring' is not possible at present). However, whilst such studies highlight the potential dynamic efficiency improvements competition can drive, it may not be appropriate to apply estimates from studies of other sectors to the present water industry.

3 Ofwat

4 S, Saal, D, Parker, T, Weyman-Jones, T, Determining the contribution of technical change, efficiency change and scale change to productivity growth in the privatised English and Welsh water and sewerage industry: 1985-2000. Journal of Productivity Analysis, 2007 28(1-2). pp 127-139

5 F Erbetta, M Cave, M, Regulation and Efficiency Incentives: Evidence from the England and Wales Water and Sewerage Industry. Review of Network Economics, 2007 Vol. 6(4). pp 425–452 www.rnejournal.com/artman2/uploads/1/erbetta_et_al_RNE_dec07.pdf

6 Environment Agency: Water resources in the south east: a shared strategy, 2008

7 South-East Queensland Water Grid Manager, viewed on 10 March 2009, <http://www.seqwgm.qld.gov.au>

8 Office of Fair Trading: Productivity and competition: an OFT perspective on the productivity debate, 2007.<http://www.oft.gov.uk/shared_oft/economic_research/oft887.pdf> and S, Nickell, (1996), 'Competition and Corporate Performance. Journal of Political Economy, Vol. 104. and R, Disney, J, Haskel and Y Heden, Restructuring and Productivity Growth in UK Manufacturing, Economic Journal 2003 , Vol. 113. and Y Zhang, D, Parker and C Kirkpatrick, Assessing the effects of privatisation, competition and regulation on economic performance: the case of electricity sector reform. Department for Economics, SCAPE, Working Paper Series, 2005 Paper No. 2005/11. <http://ideas.repec.org/p/sca/scaewp/0511.html>

A.16 In the 2004 price review, Ofwat assumed that operating expenditure efficiency for existing capacity could increase by 0.8 per cent a year and for new capacity by 1.2 per cent a year. Capital expenditure efficiency for existing and new capacity could increase by 1.1 per cent and 1.6 per cent respectively.[9] For the purposes of the cost-benefit analysis, it is assumed that three quarters of this change would be achieved through regulation and a quarter through competition for the relevant capacity. In addition to this, the following further gains are achieved under different scenarios. So in the case of capital expenditure efficiency for existing capacity in scenario six, the year-on-year gain is 1.3 per cent – 0.9 per cent under regulation, an additional 0.2 per cent from the introduction of competition and a further 0.2 per cent from in the market competition.

Table A.4: Further dynamic efficiency gains (per cent) over competitive baseline assumption

Per cent further improvement	Capital and operating expenditure
Scenario two	10
Scenario three	10
Scenario four	10
Scenario five	20
Scenario six	20

Source: Review

Timing

A.17 There is also the issue of how quickly competition flourishes, leads to participation in the market and generates productivity gains. The analysis assumes that the sharpest falls in the incumbent's market share are experienced within the first few years of competition as they face the threat of competition. Thereafter, the incumbent's share of the market continues to fall, although at a slower pace. Furthermore, it is reasonable to expect that many of the productivity gains of competition are front loaded, as productive inefficiencies are driven out in advance of the introduction of competition. The threat of competition, rather than actual competition, is a key driver of significant benefits. Therefore, the one-off productive efficiencies are applied at the introduction of the regime, and dynamic benefits lead to year-on-year productivity improvements.

Scope

A.18 The scope for competition within the value chain, across markets, between assets and over time will also determine the scale of the benefits of competition.

A.19 Scenarios two to four are widely applicable along the value chain and across markets as they do not depend on competition in the market to be effective. By contrast scenarios five and six can only be applied where there is the possibility of head-to-head competition. This is restricted to resources and treatment where there is a choice of supply. It does not apply to islanded assets or monopoly assets such as infrastructure. For these assets, another model, such as the competition for the market model, would have to be adopted. As forms of competition for the market, scenarios two to four are most likely to deliver efficiencies at the point of contracting (though these should also lock in assumed future efficiencies).

A.20 Competition between new and existing assets will depend in part on addressing the capital value discount of around 80 per cent. This can be achieved by focusing the discount on the contestable elements of the value chain or allowing discounted prices to rise, though this will become less important over time as existing capacity is replaced by new capacity at full cost.

9 Ofwat: Future water and sewerage charges 2005-10: final determinations. 2004 Table 7. <http://www.ofwat.gov.uk/content?id=c74295f6-53f7-11dd-9ee4-c59d85aa610a>

Focussing the capital value discount allows competition to operate across all assets, otherwise competition will predominantly be for incremental capacity. In scenario two, three, four and five competition is for incremental capacity. In scenario six it is for all capacity.

Service and quality improvements

A.21 Introducing competition is likely to have an impact on service and quality levels. Some supply could be low-price, low-valued added, while other supply may be more expensive, offering a better service, greater security of supply or use less chemicals or energy. Whilst these are important and will be key benefits to competition, no attempt to quantify these in monetary terms has been made.

V: Costs

A.22 This section examines the scale of potential costs to be used in the cost-benefit analysis of each scenario. Costs can arise from more expensive financing, increased regulation, market set-up and management costs and incumbent costs.

Financing

A.23 The introduction of competition could have both transitional and long-term impacts on the cost of financing. These would be in addition to any impacts on the credit markets as a result of the current financial situation. In its Pre-Budget Report, the Treasury forecast that credit markets were likely to ease in 2010, with the three month sterling interbank rate stabilising around 20 basis points higher than forecast at Budget 2008.[10] This would be before any of the scenarios above would take effect.

A.24 If changes to the industry to facilitate competition breach existing debt covenants, then companies may ultimately be forced to repay their outstanding debt if investors decided to enforce. Consultants engaged by the water companies suggest that if all debt defaulted and was enforced this could be in the region of £2 billion if redeemed at par and £7.2 billion if redeemed at different (so called Spens) prices.[11] Whether covenants are breached is ultimately a legal question and any action in response a decision for investors. It is unlikely that scenarios two, three or five would breach covenants except in some highly-geared companies with restrictive covenants. Scenarios four and six could result in more widespread breaches, if the associated regulatory and market arrangements resulted in material adverse effects. The financing implications could be significant. For illustrative purposes, the analysis assumes that renegotiation could cost £400 million in the case of scenario four and £1 billion in scenario six.

A.25 The on-going cost of financing could also be adversely affected as investors would expect a higher cost of capital to compensate them for the increased risk of operating in a competitive environment and companies reduce their level of gearing to maintain credit ratings. These impacts would be more pronounced where a focused approach to the allocation of the regulatory capital value between business units was adopted or the whole regulatory capital base was at risk. Illustrative analysis for the water companies based on analysis of the energy sector suggests a competition for the market model could increase the cost of capital by 100 basis points and a competition in the market model by 400 basis points. Depending on whether the discount in the regulatory capital value is focused or not, they suggest gearing levels may also have to fall to 70 per cent and 50 per cent respectively.

10 HM Treasury: Pre-Budget Report 2008: Facing global challenges: supporting people through difficult times, 2008. Chart A3 Page 160. <http://www.hm-treasury.gov.uk/d/pbr08_annexa_339.pdf>

11 National Economic Research Associates: Economic Consulting Financial Implications of Competition Models Water UK, 2009

A.26 As the consultants for the water companies recognise, evidence available to illuminate this issue is limited and is very specific to the regulatory and legal framework in place. Other sources, reflecting different competitive models and frameworks, suggest that the increases in the cost of capital and on gearing levels could be lower.[12]

A.27 The competitive models proposed here for the water sector differ from those examined by the water companies' consultants, in some important respects, in particular regarding the scope of market opening and the extent of the value chain exposed to competition, and the potential additional range of protections (for instance against stranding) that might be applied relative to the electricity models examined. For instance:

- the potential protection afforded by any new regulatory framework with regard to the impact of competition on existing plant, the risk of stranding and returns;
- by retaining the integrated nature of the incumbents, the impact of ownership separation on income risk would not be relevant;
- the possibility that greater use of long-term contracts for at least some merchant plant supply could materialise, thereby potentially reducing the impact on the level of gearing and income risk;
- the ability to pass on costs in a competitive market; and
- the significant first mover advantage in relatively smaller water markets might suggest a lower risk of stranding (although incumbents pricing strategies may be constrained by a need to avoid charges of predation under Competition law).

These factors could reduce the estimated impacts on financing costs, potentially significantly.

12 Single Electricity Market Committee :Fixed Cost of a Best New Entrant Peaking Plant for the Calendar Year 2009, 2008. Section five. www.allislandproject.org/en/capacity-payments-consultation.aspx?article=c992e67e-9ab7-4150-9729-de5edc8deb2c Economic Regulation Authority: Decision on the Maximum Reserve Price Capacity Price Proposal 2011/12. Page 9, 2009. www.era.wa.gov.au/cproot/7283/2/20090120%20D200900408%20Decision%20on%20the%20Maximum%20Reserve%20Capacity%20Price%20Proposal%20for%202011-12.pdf

Box A.1: The cost of capital

The capital asset pricing model is commonly used in determining the weighted average cost of capital in regulated industries. The cost of capital depends on the cost of debt and the cost of equity and the level of gearing. In the case of the models of competition proposed by the review, discussions with investors have been inconclusive regarding the perceived risk of long-term contracted plant relative to regulated plant, with a credit rating of A- and similar gearing levels. Merchant plant is likely to have a rating of BBB+ and lower gearing levels. Spreads between such debt have risen from an average of less than 20 basis points over the last 10 years to a peak of over 200 basis points recently.[13]

The cost of equity depends on the risk free rate, the equity risk premium, the asset beta and the level of gearing. In the 2004 price review, Ofwat adopted an implied asset beta of 0.45 on an equity beta of one and gearing of 55 per cent. For contracted plant, discussions with stakeholders suggest that the beta would be below 0.6 and for merchant plant with contracts less than 0.8. The actual beta would depend on the legal, regulatory and market frameworks in place. Gearing levels for these competitive elements of the value chaincould be 50 and 70 per cent, but would depend on market conditions.

On this basis, at the current time, the weighted average cost of capital for contracted plant would be around 80 basis points more expensive than the 5.1 per cent post tax figure assumed by Ofwat in the 2004 periodic review and the cost of capital for merchant plant would be around 240 basis points more expensive. Assuming the average debt premium over the last 10 years and less conservative asset betas, the weighted average cost of capital could be higher by 30 basis points and 80 basis points respectively. There are a number of asymmetric risks from competition not considered by the capital asset pricing model which could also impact on the cost of capital.[14]

A.28 In determining what costs should be included in the cost benefit analysis, it is important to note Ofwat's guidance on company structure that "each company is free to choose a more highly-geared structure than we assumed, but this is wholly at its own risk and its investors' risk. The regulatory regime does not provide a 'safety net' for investors."[15] Highly geared companies cannot assume that Ofwat will allow them to pass through the additional costs from breaching covenants and de-gearing over and above those incurred by a company with a gearing level above the range assumed by Ofwat in price setting of 55 per cent. Indeed, from a regulatory perspective, it would be inappropriate for companies to recover these costs from customers as not only would customers be bearing the cost of financing decisions from which shareholder have benefitted, but it would provide perverse incentives for companies to write increasingly restrictive covenants to increase returns to shareholders and to inhibit regulatory changes.

A.29 For the purposes of the cost-benefit analysis, three scenarios have been modelled, reflecting different financial circumstances: a High scenario (A), a central scenario (B) and a low (C) scenario, with the following cost of capital premia and average industry de-gearing levels:

13 National Economic Research Associates: Cost of Capital for PR09: final report for Water UK, 2008 Section p57 Table 7.2. p58 Table 7.3 <http://www.water.org.uk/home/news/press-releases/cost-of-capital-for-pr09/080623-nera-water-uk-wacc-report-final.pdf> and National Economic Research Associate presentation What is the appropriate cost of capital in the current climate? To the ninth Water UK annual city conference

14 National Economic Research Associates: Cost of Capital for PR09: final report for Water UK. 2008 Section p126 section A.3 <http://www.water.org.uk/home/news/press-releases/cost-of-capital-for-pr09/080623-nera-water-uk-wacc-report-final.pdf>

15 Ofwat: Setting price limits for 2010-15: Framework and approach - a consultation paper, 2007. Page 47. <http://www.ofwat.gov.uk/pricereview/pr09phase1/pap_con_pr09meth.pdf?download=Download#>

Table A.5: Cost of capital premia (basis points) and required industry de-gearing (percentage points) of different scenarios

Nature of contestability/ cost of capital increase (basis points) and reduction in gearing (percentage points)	High	Central	Low
Monopoly	0/0	0/0	0/0
Market-like	0/0	0/0	0/0
Competition for the market	100/0	60/0	30/0
Competition in the market	400/ up to 5	250/ up to 5	100/ up to 5

Source: Review

A.30 The analysis does not determine where the costs from breaching covenants and de-gearing above and beyond those incurred by a company with a gearing level assumed by Ofwat should fall. The cost-benefit analysis is therefore presented with and without these results. For the purposes of illustration, current gearing levels within the regulated business of 66 per cent have been assumed, with a range from 19.6 per cent to 88.1 per cent.[16] There may be further debt held by the holding company, but this cannot be quantified. On the basis of the 2004 periodic review determination, the implied difference between the cost of equity and cost of debt is 3.4 percentage points. Highly geared companies hold approximately 40 per cent of the total debt stock. For illustrative purposes the cost of renegotiation for these companies is assumed to be twice that for less highly geared companies.

Regulation

A.31 Increases in regulatory costs of up to 10 per cent of current costs or £2 million for Ofwat and £350,000 for the Drinking Water Inspectorate appear plausible in the medium-term.

Market costs

A.32 The market costs for scenario two are assumed to be negligible. There is limited international evidence on the market costs of upstream competition, but discussions with stakeholders suggest that set up costs could be in the region of £10 million and on-going costs of the order of £5 million a year, based on the experience of a The south-east Queensland water grid manager (a procurement entity) and the Irish electricity market (a bilateral market).

Company costs

A.33 In the case of scenarios two and five incumbents' costs are estimated to rise by around £1 million a year as a result of the extra scrutiny required. For broader models, figures of £10 million for set up costs and £2 million for on-going costs are assumed. After discussions with stakeholders, contracting costs are likely to be small at around one per cent of the additional contract value.

16 Ofwat: Financial Performance and expenditure of the water companies in England and Wales 2007-08, 2008. <http://www.ofwat.gov.uk/content?id=c20f7439-8a12-11dd-8e74-23263f1bd6c4>

VI: General Approach

A.34 The competitive regimes considered in each scenario can impact both on capital expenditure on assets with varying lifetimes and on operational expenditure. Longer appraisal periods would therefore tend to increase the net-present value, since costs tend to be incurred early on, and benefits felt later. It is judged that an appraisal period of 30 years is sufficient. In accordance with *The Green Book*, a real discount rate of 3.5 per cent is used.[17]

A.35 Whilst the distribution of costs and benefits of competition between end users and companies is important, for the purposes of determining an aggregate net-present value figure, no distinction is made between them. However, it is expected that any increases or reductions in costs are largely passed on to the consumer after a transitional period – either by the workings of competition or via regulation.

A.36 The number and identities of the active companies (that is, those that participate in the market by selecting the best deals from competing providers) there are in the market will have an impact on the behaviour of suppliers and the distribution of benefits. If firms cannot price-discriminate and the number of active participants is low, then the incumbent is likely to charge a relatively high price overall, since the loss of business to any entrant will be relatively low. If, on the other hand, the number of active participants in the market is high, this could push down the prices of the incumbent (and encourage entry into the market by other firms) with knock-on benefits to non-active participants too.

VII: Risk assessment

A.37 Table seven presents the residual risks which are considered relevant in each of the scenarios. These reflect both the likelihood of the risk arising and its impact (after accounting for mitigating actions). There is a risk that benefits may have been over or underestimated. The estimates in this cost-benefit analysis are cautious (low) compared to experience in other markets where the impact of competition has been assessed.

Implementation and set-up costs

A.38 These costs estimated cautiously (high) and, where appropriate, are based on costs experienced elsewhere. However, as the market increases in size and complexity, and where extrapolation from the experience in other jurisdictions becomes more tenuous, the risk of under or overestimation increases.

Competition does not thrive

A.39 Handing investment decisions to a third party is likely to increase confidence and encourage entry, although the market also needs to be large enough. There is a risk that under scenarios two and five, where investment decisions are still largely determined by the incumbent, competition will not flourish.

Finance issues

A.40 While the figures used in this analysis are believed to be conservative (high), there is a risk that investors could demand a higher cost of capital or compensation than expected. This is addressed through a high cost option.

17 HM Treasury: The Green Book: Appraisal and Evaluation in Central Government, 2003 <http:// www.hm-treasury.gov.uk/green_book.htm>

Impact on the Environment

A.41 The risk that upstream competition leads to harmful impacts to the environment is judged to be very low. The UK and Welsh Assembly Governments can mitigate any risk through policy direction.

Table A.6: Residual risk matrix

Risk to outcome:	Benefits	Costs	Competition doesn't thrive	Cost of capital	Environment
Scenario two	High	Low	High	Low	Low
Scenario three	Medium	Medium	Low	Medium	Low
Scenario four	Medium	Medium	Low	Medium	Low
Scenario five	High	Low	High	Low	Low
Scenario six	Medium	High	Low	High	Medium

Source: Review

VIII: Results

A.42 This section sets out the monetised impacts of each scenario. These changes are relative to a business as usual net present cost of over £160 billion over the next 30 years. The additional costs of de-gearing by highly geared companies could be of the order of £4 billion.

Table A.7: Potential net present value of alternative scenarios (£ billion)

Model/NPV £ billion	High	Medium	Low
Market-like	1.3	1.3	1.3
For the market (incremental)	2.8	4.2	5.3
For the market (broad)	-1.9	1.1	3.4
In the market (WSL)	-0.1	0.4	1.0
In the market (broad)	-23.0	-12.2	-1.5

Source: Review calculations

B Terms of reference

B.1 The Secretary of State for Environment, Food and Rural Affairs, the Chancellor and Welsh Ministers have commissioned an independent review of competition in the water and sewerage sectors. This fulfils a commitment to bring forward a review of the eligibility threshold and a wider review of the competition framework and complements on-going work by the economic regulator, Ofwat.

B.2 The Review will have the principal goals of increasing efficiency of water use and delivering benefits to both non-household and household customers. The Review will consider the scope to deliver benefits and drive innovation through developing competition and contestability in all aspects of the supply chain in the water and sewerage sector and will recommend changes to the legislative and regulatory frameworks needed to deliver those benefits, recognising the circumstances in England and Wales.

B.3 The Review will include an assessment of the costs, benefits, risks and feasibility of extending competition and contestability in water and sewerage services by looking at potential models in liberalised markets, best practice in other industries and demand from stakeholders. This will include consideration of the impact of proposed changes on:

- availability and sustainability of water supplies;
- prices;
- quality of service;
- public health;
- environment;
- encouraging water efficiency;
- innovation, research and development;
- investment in infrastructure; and
- reducing regulatory burdens.

B.4 It is very important to Government that the interests of household customers are protected in the round, and vulnerable customers in particular. The Review will consider changes that can be made to the current regime through secondary legislation as well as changes that would require primary legislation. It will include consideration of:

- the eligibility thresholds;
- statutory water supply licensing provisions, including the costs principle and policy on access pricing generally;
- extending access to sewerage services;
- Ofwat's powers in relation to competition;
- statutory inset appointment provisions;

- relevant issues surrounding the abstraction of water; and
- any other specific changes that would deliver benefits and drive innovation through further competition and contestability in water and sewerage services in England and Wales.

B.5 Ofwat, the industry regulator, holds a formal advisory role for Government. Ofwat is carrying out its own work stream considering how best to further competition in the water and sewerage sector. This review for Government will draw on Ofwat's work and will advise ministers on the outcome of Ofwat's review.

B.6 The Review will report to the Secretary of State for Environment, Food and Rural Affairs, the Chancellor and Welsh ministers.

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