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

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Preparing for the future – Ofwat's climate change policy statement

Ofwat – Protecting consumers, promoting value and safeguarding the future

www.**ofwat**.gov.uk

About this document

In this policy statement, we look at how climate change will affect the water and sewerage sectors in England and Wales. We highlight the main impacts and outline how we are responding to the challenges and how we expect each company to respond.

For further information or details related to this document, contact Mike Keil, Head of Climate Change Policy (mike.keil@ofwat.gsi.gov.uk).

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Acknowledgement

We would like to gratefully acknowledge the Met Office for scientifically reviewing this document.

Foreword

Changes to our climate affect us in every aspect of our lives and present long-term global challenges for policy makers and for those who are involved in managing the world's resources. Greater weather volatility could lead to scarcity of water in many parts of the world, making water an ever more valuable commodity. A warming climate and expected population growth will also increase the demand for water and place further pressure on water resources.

The water and sewerage sectors in England and Wales also face these challenges. The twin approach of adapting to a changing climate while at the same time mitigating future impacts by reducing greenhouse gas emissions is not straightforward and there are no quick fixes. We are well placed to plan for and tackle these challenges, with some of the world's best climate research scientists based in the UK. Their work provides sound evidence on which to base decisions, and the sectors need to start to plan and build their responses based on that evidence.

Our aim, as the economic regulator of the water industry, is to protect consumers, promote value and safeguard the future. To achieve this, we need water and sewerage sectors that are sustainable in all respects: financially, socially and environmentally. This is essential to achieve a long-term, high-quality service to consumers. Environmental sustainability in particular demands an effective response to climate change. This is why 'taking a long-term view of sustainability' is one of the key strategic priorities in 'Ofwat's strategy – taking a forward look', which we published in April 2008.

In this policy statement, we set out key areas where climate change will affect the water and sewerage sectors in England and Wales. We then highlight what we are already doing and what we plan to do to meet the challenges ahead, as well as our views on the water and sewerage sectors' responsibilities.

We will review our climate change policies regularly in response to the best available science and other external drivers, such as legislation. We will work with stakeholders to ensure that our policies reflect Government policies. Most importantly, we will work to make sure that we act in the best interests of consumers, driving high-quality and sustainable water and sewerage services now and in the future.

Regina Finn
Chief Executive

Introduction

Climate change presents two serious challenges to the water and sewerage sectors in England and Wales: one of mitigation and the other of adaptation. Mitigating the impact of future climate change by reducing greenhouse gas (GHG) emissions is something that all sectors of the economy, and we as individuals, share responsibility for. The water and sewerage sectors must play their part in this agenda. Because the sectors are energy intensive, this raises particular challenges. The operational activities of the sectors contribute about 1% of the UK's GHG emissions, which shows the scale of the challenge.

At the same time, even if all carbon emissions were held at today's values, we would still face the impacts of climate change for decades to come. This means that adapting to these impacts is an equally, if not more, pressing challenge.

Effective responses to climate change will demand leadership and innovative thinking. The Government has identified this issue as one of central importance in its water strategy for England, 'Future water', published earlier this year. We welcome both the Government's water strategy and the Welsh Assembly's 'Environment strategy', and we set our own policies in this context.

We have also monitored closely progress of the Government's wider policies relating to GHG emissions, such as the carbon reduction commitment, and take account of the fact that these affect the water and sewerage sectors as they do every other sector of the economy.

This policy statement describes how we will regulate in a way that takes account of climate change, encourage and enable companies to respond to climate change and by doing so achieve our aim of protecting consumers, promoting value and safeguarding the future. We examine the challenges of mitigation and adaptation. We then describe in more detail the areas in which climate change has an impact on the water and sewerage sectors and outline how we are responding to the key issues. We also highlight our relevant policy areas and set out our vision of how the sectors collectively can respond in an appropriate and responsible manner.

While this document states our current position, we recognise that the science of climate change is evolving and constantly improving. We look forward to the latest results from the UK Climate Impacts Programme (UKCIP) later in the year. The legislative framework in which we operate is also subject to change, as the Climate Change Bill is currently being debated in Parliament. Unexpected weather events may have an impact on how the water and sewerage sectors operate. We will continue to assess and evaluate our regulatory approach in response to these external factors.

We set price limits every five years and are currently preparing for the 2009 review, covering the years 2010-15. We have already set out our overall approach to the 2009 price review in our methodology paper, 'Setting price limits for 2010-15: Framework and approach'. This policy statement does not change that approach or place new obligations on the companies. However, it does describe how we are considering climate change in the context of the 2009 price review and puts this in one document along with a number of other initiatives we are involved in.

Structure of this document

This document contains three chapters which focus on:

- climate change adaptation;
- climate change mitigation; and
- overarching issues.

Each chapter is made up of policy strands which outline the key issues for the water and sewerage sectors. Some of the strands could be placed in more than one chapter. This reflects the fact that there is significant interaction and overlap between them. There are dangers in treating issues in isolation; for example, an effective adaptation solution might have a large carbon footprint which would be undesirable in a mitigation context.

Chapter 3 considers overarching issues, such as sustainability, that do not fit into either of the two preceding chapters. These issues illustrate how climate change influences our wider regulatory functions and, subsequently, how we protect consumers through our approach towards safeguarding the future.

1. Climate change adaptation

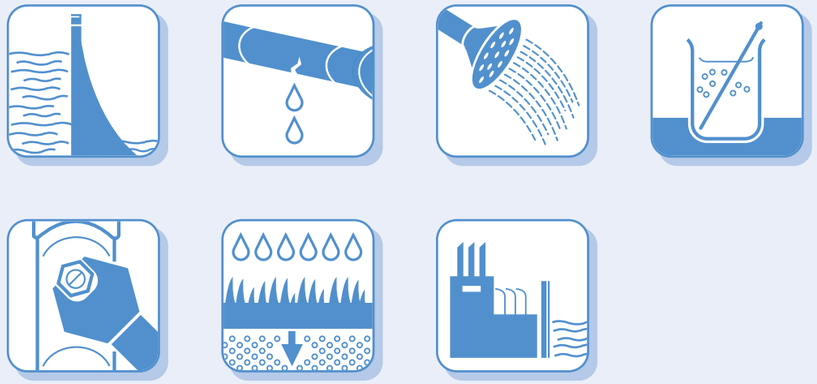
In this chapter, we focus on how the sectors need to adapt to cope with future changes in the climate.

There are uncertainties associated with future climate change scenarios and their impacts. However, the uncertainties should not be used as a reason for not taking action. There is an active debate concerning the optimum point to take action. The Government's Stern Review indicates that the benefits from early action could outweigh the economic costs of not acting. Climate change uncertainties should be considered in the context of an overall risk-based approach towards business planning and asset management.

We expect the water and sewerage sectors to adapt in a phased, responsible and appropriate manner. This means that adaptation plans must be based on sound science and evidence. In some cases, there are significant regional differences in future climate change scenarios, so a range of approaches may be required.

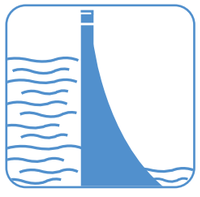
The periodic nature of our price review process lends itself to a phased response to adaptation. This should lead to the adoption of an approach which avoids large commitments that are tied to one specific future climate scenario. This approach will offer both protection and value to consumers.

We recognise the significance of the challenges facing the water companies. So, as well as addressing the issue in the 2009 price review, we will carry out an evidence-based analysis of adaptation within the sectors after the review. This will help us to understand the companies' present position on adaptation so that we can work with them on their plans for the future.



Water resources

Balancing supply and demand in a changing climate



Climate change presents both opportunities and threats to water resources. It is predicted that rainfall patterns will change; recent climate predictions suggest wetter winters with little change, or drier conditions, expected in the summer. This will have an impact on water resources. For example, the amount of water that can be taken from rivers may be constrained by lower water flows. Changes to the seasonal distribution and intensity of rainfall will affect the recharge of reservoirs and ground water; this may be beneficial or not. In addition, warmer temperatures brought about by climate change could increase the demand for water. For instance, the watering of gardens will be expected to rise in a hotter climate, while wetter winters may put additional pressures on drainage.

Future pressures on water resources have to be predicted accurately because of the long time it takes to put new resources in place. Climate change is just one of the factors that will affect the balance between water supply and demand in future. 'Future water' suggests that, on their own, measures to control demand are unlikely to be sufficient to meet future requirements. On the supply side, new water resources are likely to be required if the levels of service that consumers expect are to be met.

We are working with companies to deliver improvements on both the water supply and demand sides. On the demand side, we are promoting water efficiency measures and innovative tariffs; on the supply side we set challenging leakage targets. These topics are discussed in more detail later in this chapter.

Each company is required by law to produce water resource management plans (WRMPs). These long-term plans set out how the companies will address the future challenges of maintaining the balance between supply and demand. The Environment Agency's WRMP guidance includes specific details on how companies should incorporate climate change in their plans.

The WRMPs underpin the basis for investments within the price review. We expect each company to put forward business plans for delivering water and sewerage services which are consistent with their WRMPs. We will scrutinise the companies' business plans so that we are confident that the right investment is made at the price review in 2009 and in the future.

We have

worked with the Environment Agency on guidance and are currently reviewing water resource management plans.

We expect

that companies will seek to understand and plan for the impact of climate change on both the supply of and demand for water resources.

We will

work with stakeholders to develop improved evidence and guidance for long-term water resource planning.

Leakage targets

Making sure that leakage strategies are sustainable and take account of the impact of climate change

Adaptation through effective leakage management is likely to become increasingly important in future climate change scenarios because of increasing uncertainty in water resource availability and growing consumer demand.

Reducing leakage can also help cut GHG emissions and, therefore, contribute towards climate change mitigation. Treating and distributing water uses energy, which creates emissions. If less water is lost through leakage, there will be a reduction in these energy-intensive processes and, consequently, fewer emissions. There will be a net reduction in emissions if the emissions associated with the water lost from leakage are greater than emissions from leakage reduction activities.

The companies in England and Wales manage water distribution networks with a total length of about 335,000 km. In addition, there are almost 24 million connections to properties. All of these have the capacity to leak, so eliminating leakage altogether would be impossible. Targets for leakage have to balance the benefits to the environment from reducing leakage with the cost to consumers of finding and fixing leaks.

To address the balance between the needs of consumers and the environment, leakage targets are currently set at the economic level of leakage (ELL). This is the level at which it would cost more to reduce leakage further than to produce the water from another source.

In November 2007, we published best practice guidance on how to take external factors (of which GHG emissions are a major component) into account when calculating the economic level of leakage. We require each company to use this guidance in their business plan submissions. Operating at the target level of leakage means that the total financial, environmental and social cost of supplying water is minimised, ensuring best value for consumers and the environment. The target level will change over time to reflect evolving external factors, including the impact of climate change. This approach provides a basis for sustainable leakage management which will play a key part in long-term climate change adaptation.

We have

monitored leakage performance since 1997 and researched the effects of different leakage strategies on the environment.

We expect

companies to meet robust leakage targets set as part of a wider long-term strategy to maintain security of supply.

We will

ensure that leakage targets take full and proper account of external environmental factors, including the impact of GHG emissions.

Water efficiency

Responding to climate change by promoting efficient water use

Climate change will affect the availability of water resources and could increase the demand for water, unless we begin to use water in a smarter, more efficient, way. As water resources become increasingly uncertain, water efficiency will become an important part of our adaptation effort.

In addition, water efficiency can lead to significant reductions in GHG emissions. These come from the energy required to deliver and take away and treat the water, and also indirectly from the energy associated with heating it in the home.

Water efficiency measures can provide more sustainable solutions than either increasing the number (or size) of supply assets, or reducing leakage. At the same time, water efficiency alone has limitations as the future impacts of climate change on water resources are potentially much greater than the scope for future water efficiency (see 'Future water', Defra 2008).

Since we set voluntary water efficiency targets in August 2007, the sectors have responded and worked with us and the Environment Agency to develop more refined targets for 2010-11 onwards. We have set out more detail on the nature of these targets in 'Future water efficiency targets: A consultation', published in June 2008.

Metering has been shown to reduce average household water use by about 10% (National metering trials, 1993). We support the increased use of metering as part of an optimal approach to balancing supply and demand. Companies should assess the role and pace of additional metering in their long-term water resource plans.

In heavily metered areas, water companies' revenues are affected by increased water efficiency – because if customers waste less water, their metered consumption will go down and as a result they will pay less. Therefore, in some instances it may not be in the companies' best financial interests to promote water efficiency. To avert this, we have introduced a revenue correction mechanism that will be implemented at the end of each price review period. In addition, to further encourage companies to share information and learn from others, we publish a water efficiency good practice register on our website, which is updated regularly.

We have

set voluntary water efficiency targets and this summer we are consulting on revised targets for inclusion in the next price review.

We expect

companies to consider carefully the role of water efficiency when planning how to balance supply and demand now and in the future.

We will

continue to contribute proactively to the debate on water efficiency and will include water efficiency targets in the 2009 price review.

Water quality and treatment

Making sure that climate change impacts are integrated with wider water quality drivers

Climate change will have a significant impact on water quality and treatment. Changes in temperature can influence the processes involved in treating water and sewage and the natural processes that affect water quality. Rainfall patterns will also affect both flows in rivers and volumes of wastewater discharged to them, and, as a result, the quality of raw water. The impacts need to be understood fully for water companies to adapt effectively.

Climate change will impact on the efficiency of temperature-sensitive treatment processes. This could have contrasting results; on the one hand, increased temperatures will speed up chemical and biological treatment processes for both water and sewage. However, higher temperatures are likely to cause a detrimental reduction in dissolved oxygen in surface waters. This could increase the need for further treatment because of the reduced ability of receiving waters to cope with sewage and pollution.

Changes in water flows brought about by a changing climate will have an impact on the quality of raw water. Lower flows mean less dilution and dispersion of sewage. Therefore, it may be necessary to treat sewage to a higher standard to maintain water quality.

Increased volumes of sewage arising from more intense precipitation will mean that more energy (and GHG emissions) will be required to transport and treat sewage. The alternatives are to keep surface water out of sewers (see the drainage strand on page 11) or to accept more frequent and larger combined sewer overflow discharges. Additional discharges will create further pressures on the quality of raw water.

There can be a conflict between enhanced local environmental standards through improved water quality, and the detrimental global impact from GHG emissions arising from the energy-intensive treatment processes used to achieve those higher standards. The drive towards enhanced local standards limits the potential for companies to reduce their emissions. We encourage stakeholders to assess all environmental and social effects when considering treatment options and the implications of delivering higher local standards.

We see merit in investigating further the impact that different risk management strategies relating to water quality will have on climate change mitigation and other climate change adaptation issues. To encourage informed decision making, the risks from both water quality and climate change need to be quantified consistently. We are clear that the challenges of climate change have to be managed carefully to ensure that the appropriate quality standards continue to be met.

We have

encouraged companies to take a long-term view of how they will treat raw water and sewage in a changing climate.

We expect

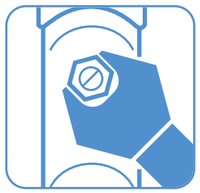
companies to understand and act on the impacts that climate change will have on water and sewage treatment.

We will

work with other regulators and stakeholders to influence the debate surrounding the tension between climate change mitigation and improving local water quality.

Maintaining serviceability

Making sure that assets continue to be fit for purpose in a changing climate



Future climate change is often thought of in terms of low-frequency, high-impact events, such as extensive floods or prolonged droughts. However, the effects of a gradual shift in everyday conditions could be equally important. This is particularly relevant in the water and sewerage sectors where the extensive asset base (for example, pipes, sewers and treatment works) is influenced by the weather conditions.

Serviceability is the capability of a system of assets to deliver the right level of service to customers and the environment both now and in the future. It is essential that the right sets of measures and monitoring processes are in place to track serviceability in a changing climate.

A changing climate could affect assets in a range of ways, some of which are likely to be unpredictable. This may include an increase in burst mains or sewer collapses because of changes in soil moisture content. Sewers may be placed under increasing stress as they will have to operate at capacity more often because of more frequent, intense precipitation events. A rise in temperature and volume of water or sewage that needs treating could affect the performance of both water treatment and sewage works (see the water quality strand on page 9).

We reviewed our serviceability indicators after the 2004 price review and will continue to measure and monitor the performance of assets so that they remain fit for purpose in a changing climate. It is important that we develop the correct long-term sets of measures to take account of a changing world so that companies make the right investments to safeguard future services. We think it is critical and in the companies' best interests that they take ownership in this area. Each company should use its expertise and detailed knowledge of its own asset base to make sure its long-term approach to asset management stands up to future climate change scenarios.

We have

worked with the water and sewerage sectors to develop a suite of indicators for long-term serviceability.

We expect

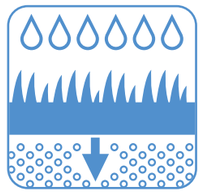
companies to continue reporting clear and accurate data that shows how their assets are performing and to develop forward-looking asset management plans to maintain serviceability.

We will

work with the water and sewerage sectors to identify the right set of measures for tracking long-term serviceability of assets in a changing climate.

Drainage

Achieving sustainable drainage solutions in a changing climate



The way in which drainage is designed and operated has a major impact on the likelihood of surface water flooding. Climate predictions for the UK suggest that there will be wetter winters and, possibly, drier summers in future. However, this is the average picture and the specific nature of the rainfall is often an important factor in drainage performance. Short, intense, extreme rainfall events can cause major surface water drainage problems, particularly in urban areas. Such events can occur even in the driest of summers.

Traditionally, the design of drainage systems has been based on statistical analysis of past rainfall patterns, often expressed as return periods. However, return periods were calculated assuming a constant climate. Under a changing climate it may no longer be sufficient to use historical return periods, so their use will need to be reconsidered.

Currently, new sewerage systems in England and Wales are generally expected to be able to accommodate rainfall of up to a 1 in 30-year return period event. Volumes above this are 'exceedance flows' and result in surface flooding. Climate change is predicted to lead to more intense rainfall events and these exceedance flows will occur more frequently.

The principle that combined (foul and surface water) sewerage systems should accommodate future flows is unsustainable in the long-term context of climate change. This is because sewerage systems have finite capacity and it would be prohibitively expensive – both financially and environmentally – for them to be expanded continually to mirror rainfall growth. When 'exceptional' rainfall overloads sewers, the resulting flood water often contains sewage washed out of the sewers.

A more sustainable approach will involve managing stormwater flows more strategically and restricting the volume of rain (surface) water entering the sewer network. We support the wider use of appropriate and innovative sustainable drainage systems (SUDS) that can slow down or hold up water flow. Reviewing the automatic right to connect the surface water drainage of new developments to the sewerage system will also play a key part in managing this issue.

At the moment, there is shared responsibility for urban surface water drainage, with a number of stakeholders involved to varying degrees. As a result, the boundaries and ownership of the responsibilities are not clear. We welcomed, and commented on, the 'Improving surface water drainage' consultation as part of the Government's water strategy. We believe that local authorities have an important role to play in co-ordinating surface water management plans.

It is important that sewer flooding risks are understood and monitored, and we are currently reviewing sewer flooding 'at risk' registers. Each company is committed to reducing the number of properties at risk from sewer flooding. Risk registers may change over time as the climate changes and we require the companies to manage them clearly and consistently.

Drainage (continued)

In order to promote the provision of effective drainage both now and in the future, we have recently conducted a study of drainage standards used in the sewerage sector. Our findings show that companies are inconsistent in their treatment of climate change. We have issued our analysis and recommended an approach to drainage standards for the future which includes uplift for climate change based on Defra's guidance. Drainage is one of the areas most vulnerable to climate change and it is essential that all stakeholders work together to deliver sustainable future solutions.

We have

participated actively in the Government's water strategy consultation on improving surface water drainage, and have published guidance for companies on their approach to drainage standards.

We expect

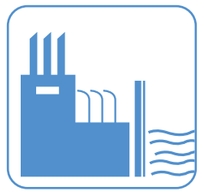
companies to take climate change into account when maintaining and building sewerage networks.

We will

publish our review of sewer flooding 'at risk' registers later this year and promote improved understanding of flood risks.

Resilience

Protecting assets and services in a changing climate



The floods of summer 2007 showed how extreme weather can lead to asset and service failure, although many assets continued to perform well under these extreme conditions. One of the major challenges to adaptation in a changing climate is how to make sure that water and sewerage services are resilient enough to cope with extreme events.

In our 2009 price review methodology paper, we asked each company to review the risk its critical assets face from surface water flooding and how it will meet the challenge of supplying consumers in extreme situations. To support companies and help them prepare for the price review, we have published an analytical framework for asset resilience to flood hazards. This document provides a framework that allows each company to:

- assess the risks to its assets from flooding;
- explore the ways in which it could mitigate the risks; and
- apply cost-benefit analysis to evaluate, prioritise and justify potential intervention options.

The framework includes considering climate change within resilience planning. It provides a consistent approach, applicable across the water and sewerage sectors, for understanding and managing asset resilience. As such, it is in line with our price review principle that investment should be based on economic risk-based criteria.

Although the framework highlights specifically the risk from flooding, companies should not consider flooding to be the only hazard. We expect companies to understand the resilience of their assets in respect of the risks from a range of hazards, both under current and changing climate conditions. We expect the principles of the analytical framework to be applied to other hazard resilience issues.

Resilience is one of the many ways in which the water and sewerage sectors will have to adapt to a changing climate. As discussed earlier in this chapter, we will carry out an evidence-based analysis of adaptation in the sectors after the 2009 price review. Resilience will be one of the key factors examined as part of the analysis. We intend our analysis to inform and guide our stakeholders on adapting to a changing climate appropriately and responsibly.

We have

produced an analytical framework for assessing the resilience of assets to flooding and evaluating intervention options.

We expect

companies to use this framework to understand and protect their assets and services.

We will

publish a wide-ranging, fact-based summary of climate change adaptation in the water and sewerage sectors after the 2009 price review.

2. Climate change mitigation

In this chapter, we look at climate change mitigation, which aims to reduce GHG emissions in order to limit their effect on our climate and, as a result, limit damaging impacts.

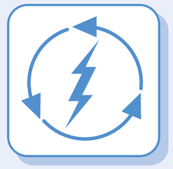
The Stern Review suggests stabilisation levels for GHGs that are required to avoid unacceptably large risks from climate change. Achieving stabilisation at the desired levels will require significant cuts in global GHG emissions. The recently formed Committee on Climate Change will be responsible for setting the UK's carbon budgets. Although the budgets are not set yet, it is likely that they will require at least a 60% reduction in GHG emissions by 2050.

The water and sewerage sectors' operational activities are directly responsible for about 1% of the UK's GHG emissions. On top of this, there is also embedded carbon associated with constructing water industry assets. Embedded carbon is the GHG emissions arising from the production of raw materials and directly from construction work. The sectors' supply chain also contributes towards their overall carbon footprint.

Also, heating water in consumers' properties produces up to seven times more emissions than from supplying and removing the water (see 'Future water', Defra 2008). Although the full extent of the water sectors' carbon footprint is hard to quantify, the mitigation message is simple: if less water is used then less energy will be required. This chapter focuses directly on climate change mitigation through reducing GHG emissions.

At the moment, there are no specific or mandatory GHG emission reduction targets for the water and sewerage sectors, although they are guided by a number of Government policy instruments designed to encourage emission reduction. The carbon reduction commitment (CRC) is expected to have an impact on water companies and this scheme is discussed further in this chapter.

While there are other environmental pressures which can drive up emissions (as discussed on page 15), we expect each company to play an appropriate part in the UK's mitigation efforts. We expect companies to understand the carbon implications of all their activities and to form mitigation plans that are consistent with their strategic direction statements (published by each company in December 2007) and overall obligations to consumers.



Carbon management

Ownership and understanding of greenhouse gas emissions

As the water and sewerage sectors in England and Wales emit significant amounts of greenhouse gases, it is important that each company measures and monitors its own emissions so that it can take responsibility for its fair share of the UK carbon burden. Understanding emission levels:

- promotes a greater understanding of the GHG contributions from specific activities;
- helps to identify which processes can be improved;
- forms a baseline for future reductions;
- results in greater transparency; and
- encourages corporate social responsibility.

In the 2008 June return, we asked each company to report its operational GHG emissions for the first time. Companies have provided this data to Water UK voluntarily for a number of years. Collecting the data in the June return formalises how emissions are reported and improves consistency through additional scrutiny of the figures.

The way in which the companies are regulated contains a built-in incentive that allows them to gain from carbon reduction through reducing the amount of power they use. In addition, from 2010 the water and sewerage sectors will be required to participate in the CRC. This mandatory cap and trade scheme will apply to large, non-energy-intensive organisations in the public and private sectors. This scheme is not a tax-raising instrument and the revenues raised will be given back to the participants according to their position in a performance league table.

The CRC covers only emissions from energy use. This means that it does not capture between one-fifth and one-third of water companies' emissions. The missing emissions are mainly non-CO_2 GHGs from methane and nitrous oxide related to sewage, which are difficult to measure accurately. The water and sewerage sectors appear very unusual among significant GHG emitters in having such a high proportion of emissions not covered by financial incentive or emissions trading schemes.

We will work with the companies to develop transparent reporting of non-CO_2 GHGs, to help them improve their measurement and understanding of all their emissions. We will also consider the case for further policy instruments to encourage a reduction in non-CO_2 GHGs. Our aim is to develop options based on robust evidence which would not overlap with existing policy instruments, such as the CRC. Future options could include financial incentives or penalties, but could only be applied when reporting is sufficiently robust. As a result, this will not be deliverable as part of the price review in 2009. Any policy instruments would need to:

- meet our long-term sustainability duties;
- align with wider policy on GHG reductions; and
- be consistent with our approach to promoting competitive markets.

Carbon management (continued)

Currently, there are no statutory obligations on water companies to reduce their emissions, although we welcomed the ambitions to reduce emissions outlined in many of their strategic direction statements. These statements demonstrate how each company is thinking and acting to secure long-term, sustainable water and sewerage services in the context of a changing climate. We expect companies to work towards reducing their emissions, through efficiency and innovation, while continuing to deliver value to consumers.

We have

included the reporting of GHG emissions in our general reporting requirements.

We expect

companies to understand and take responsibility for their own GHG emissions.

We will

develop reporting on GHG emissions not covered by the CRC and will consider the case for further policy instruments in this area.

Carbon in cost-benefit analysis

Encouraging low-carbon investment decisions

Each water company's current activities and future plans have carbon footprints. To mitigate the effects of climate change, it is important for carbon footprints to be identified and quantified – including both operational GHG emissions and embedded carbon from construction. This will enable companies to make better business decisions and plan more effectively to reduce their emissions.

In PR09/08, 'Further Ofwat guidance on the use of cost-benefit analysis for PR09', we stated that companies should investigate all costs and all benefits, including the impacts on society and the environment, of all new investment decisions. A key part of this methodology requires each company to include the shadow price of carbon, to take into account the future damage climate change may cause. We have advised companies to follow Defra's guidance on setting the value of the shadow price of carbon. Each company should understand and expose the whole-life carbon implications of its investment decisions through applying cost-benefit analysis (CBA) in the 2009 price review.

The water and sewerage sectors are developing further guidance on calculating operational and embedded carbon. We are working with the sectors and government agencies to make sure that clear carbon accounting guidelines are available and applied consistently in CBA. This is an emerging field and some areas would benefit from further guidance. For example, there are currently inconsistencies relating to the boundaries of supply chain carbon accounting, particularly when activities are outsourced.

We want CBA to be used to ensure that environmental factors are taken into account robustly. We want to encourage each company to consider a wider range of options, including low-carbon solutions. After the price review, we will analyse how including the shadow price of carbon influenced the decision-making process. We will publish our findings and use the outcomes as evidence to support future improvements to policy in this area.

We require

companies to include the shadow price of carbon in their CBA methodology as part of the price review process.

We expect

water companies to consider low-carbon investment options.

We will

review the impact and effectiveness of including the shadow price of carbon after the 2009 price review.

Catchment and land management

Reducing emissions through careful use of land

Both the type and use of land can affect GHG emissions. For example, well-maintained forests or peat bogs can act as substantial carbon sinks. Conversely, polluting activities within catchments can affect the quality of raw water. This may result in the need for additional energy-intensive end-of-pipe treatment. Therefore, it is important for companies to understand the implications of the activities which take place in their catchments – something that has been highlighted in 'Future water' as contributing to tackling the causes of water pollution.

Reducing or controlling water pollution in catchment areas can offer environmental and economic benefits by avoiding the need to carry out GHG-emitting treatment, or put in place additional assets with large embedded carbon. We also support the 'polluter pays' principle as a key lever for securing sustainable practices by all land users, and to avoid water consumers bearing the costs of others' pollution. We expect companies to play a role in this by developing an understanding of the upstream influences on raw water quality, helping to identify sources of pollution and to secure appropriate action.

Some companies own extensive areas of land. This allows them some control over the activities carried out on that land that have a direct impact on the quality of water subsequently supplied to consumers. We expect companies to manage the land they own (whether tenanted or not) in a responsible and sustainable manner. We expect proposals from companies for additional investments on their own land, to be paid for by customers, only where these are necessary to meet new statutory environmental obligations.

In some cases, companies already work within their own or third party land to maintain or deliver improvements in raw water quality. In our price review methodology paper, we outlined the context in which new investments can be made to secure raw water quality. Considered and appropriate catchment management offers a sustainable approach towards securing water quality and has potential for reducing GHG emissions.

We have

outlined a mechanism to encourage companies to work co-operatively with those who share their catchments to address raw water quality issues.

We expect

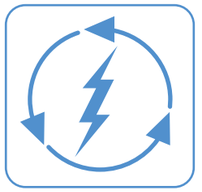
companies to manage their own land in a responsible and sustainable manner, and we expect companies to understand the influences on raw water quality within their catchments.

We will

support companies as they seek to identify polluters and secure action to safeguard raw water quality.

Renewable energy

Encouraging the appropriate use of renewable energy opportunities



Renewable energy offers companies the potential to reduce their carbon emissions. It can be either self-generated or bought from the National Grid. There is great potential for innovation in this area. Companies' mitigation strategies could include the use of renewable energy.

Energy generation is a competitive market and specific UK-wide incentives and policies apply to renewable energy generation. We would normally expect companies to develop renewable energy as a non-regulated activity (one that is not financed by customers) where the generation process is independent from the water company's core business – the appointed business' activities.

Some companies have the potential to self-generate renewable electricity using methods directly related to their core functions, such as hydro or biogas from anaerobic digestion of sewage. Where there are natural synergies with their appointed business we acknowledge that it may make sense to treat this form of self-generation as part of the regulated business.

We recently issued further guidance on this in PR09/14, 'Treatment of renewable energy'. We aim to make sure that renewable energy generation is accounted for in a transparent manner and that any benefits gained for the regulated business are shared with consumers.

At present, there are no statutory obligations on companies to use renewable energy. Water companies have set a voluntary target to ensure that at least 20% of the energy they use comes from renewable sources by 2020. Although targets such as these are commendable, we expect flexibility in their application. Carbon targets are only one of many factors that influence investment options and should not be the primary drivers of investment programmes.

Using renewable energy is just one way for each company to reduce its carbon emissions. Companies must recognise that other ways may be more cost beneficial. We expect companies to investigate a variety of options as part of their overall mitigation strategies, such as applying innovative technologies and operating more efficiently.

We have

outlined further details of our position on renewable energy generation in PR09/14, 'Treatment of renewable energy'.

We expect

companies to consider using renewable energy as part of their wider mitigation strategies.

We encourage

the self-generation of renewable energy when there are natural synergies with a company's appointed business activities and it can be shown to be cost beneficial.

3. Overarching issues

Climate change should not be treated in isolation. There are many interacting factors that will affect the long-term future of the water and sewerage sectors. In this chapter, we consider issues that are not immediately associated with climate change, but are either strongly influenced by, or have an impact on, climate change adaptation and mitigation.

For instance, innovative solutions will be required to respond to the challenges that a changing climate presents. We aim to promote innovation partly by introducing enhanced levels of competition within the water and sewerage sectors.

Sustainability

Water and sewerage sectors that embed sustainable behaviours in all their activities

Sustainability and climate change are intrinsically linked, although sustainability encompasses a wider range of social, economic and environmental issues. Sustainable water and sewerage sectors allow for services to be provided to today's consumers without compromising the ability to deliver a similar service to future generations. The impact of climate change emphasises the need for sustainable water and sewerage sectors.

We have a statutory duty to contribute towards sustainable development. We are committed to embedding it within our policies, thereby encouraging the sectors to take sensible and measured steps to safeguard the future. We view sustainability as critical to the future success of the sectors and have made 'taking a long-term view of sustainability' one of seven key priorities in our new strategy. As a result, we expect each company to take responsibility for how its activities affect all aspects of sustainability.

Our approach to sustainability is evident in our requirement that each company sets out its long-term plan for the next 25 years in its strategic direction statement. This approach will set decision making at the 2009 price review in a longer-term context and is discussed further under the setting price limits strand on page 24.

We published our first sustainable development action plan (SDAP) in our forward programme for 2007-08 to 2009-10. We are committed to reducing our own environmental impact and are currently auditing our internal operations against sustainability indicators designed to reflect Government sustainability targets. This included calculating our own carbon footprint for the first time. During 2007-08, we emitted 222 tonnes of CO_2e (carbon dioxide equivalent emissions). We acknowledge that there will be uncertainties associated with this figure and we hope to increase the accuracy of our calculations and to reduce our GHG emissions in the future.

We will audit our sustainability regularly. This will enable us to identify strengths and weaknesses in our processes and plans, and actions to address these issues. In future, our SDAP will also consider the effect of our external policies. We intend our policies to enhance the companies' ability to act sustainably and help achieve our goal of sustainable water and sewerage sectors.

We have

made 'taking a long-term view of sustainability' a key objective of our new strategy.

We expect

companies to develop their business plans within a long-term framework of sustainable service delivery for consumers.

We will

strive to improve our own sustainable obligations in both our own operations and policies.

Competition and innovation

Delivering innovation and choice through increased competition

External drivers, such as climate change and consumer expectations, mean that companies will have to change the way they operate. Such change can be promoted through increased innovation and consumer choice. By introducing competition progressively into the water and sewerage sectors, we hope to bring about innovation and change. At the moment, only limited competition exists in the sectors in England and Wales.

We consider that innovation can be stimulated in several ways. At each price review, we set the companies challenging efficiency targets and reward outperformance as incentives for innovation. Competition also drives efficiency, innovation and choice. In the energy sector, for example, competition has led to the introduction of a range of green tariffs.

Competitive pressures drive innovation more effectively than regulatory intervention ever can. We have placed at the core of our strategy an intention to introduce competition to the water and sewerage sectors progressively where it benefits consumers. In our consultation, 'Ofwat's review of competition in the water and sewerage industries: Part II', we recommended that contestable water and sewerage markets be opened to competition. We are feeding our views into the independent Government review of competition and innovation in the water industry which Professor Martin Cave is leading.

Competition would drive companies to reflect consumers' needs and deliver more choice. Increasingly, climate change and environmental issues influence consumer preferences; as a result, we would expect competition to deliver improved performance on key climate change issues.

Market forces can also drive efficiency in our use of increasingly valuable natural resources. For example, a competitive market in water rights trading could help to reveal the economic value of water. In doing so, it would encourage innovation in water efficiency and developing water resources.

Increased levels of innovation and efficiency can benefit all parts of a company's business and provide a competitive advantage. As a result, leading companies would be in a better position to respond to climate change and deliver sustainable services to consumers.

We have

incentivised innovation by setting efficiency targets and we have reviewed a wide range of options for promoting competition.

We expect

companies to address the challenges of climate change by seeking innovative solutions throughout their organisations.

We will

seek ways to stimulate innovation further by introducing competition progressively where it benefits consumers.

Consumer charges

Charging for water and sewerage in a cost-reflective manner that will benefit both consumers and the environment

In a changing climate the value of water becomes more important and the cost of delivering water is likely to rise. This is because climate change will have an impact on water resources and treatment, as highlighted in chapter 1. In addition, carbon costs associated with energy use are expected to increase. We discussed issues relating to carbon in chapter 2. The impact of climate change puts an increasing emphasis on charging strategies, which help adaptation and mitigation by encouraging greater water efficiency and, as a result, reducing emissions.

Metering allows consumers to know their water usage. It is then possible to develop a range of new and innovative tariffs. As discussed in the water efficiency strand on page 8, we encourage metering where it can be demonstrated to be cost beneficial for consumers. We believe that bills should broadly reflect the true cost of water and at the same time be as affordable as possible. Companies could use new charging strategies to help meet demand in a sustainable way. If consumers are more aware of the true cost of the water they use, they can make informed choices about their water use.

We have considered the potential of seasonal, rising block and other innovative tariffs. A number of these are now being trialled by the companies. Seasonal tariffs send a clear message to customers, as they pay more for water when resources are at their most stretched. This could become an important adaptation tool in some areas to prevent water shortages. Rising block tariffs may provide incentives to customers to use less water throughout the year. Depending on how the tariffs are constructed, they may also play a valuable part as a mitigation tool. We welcome companies' efforts to develop other innovative charging strategies.

We need to consider further how charges relate to drainage. The potential impact of climate change on drainage is significant because of the projected increase in intense precipitation events. It may be possible to use surface water drainage charging mechanisms to encourage the development of permeable areas. We will promote a debate on the best way to pay for, and therefore manage, drainage systems; this is discussed further in the drainage strand on page 11.

We have

consulted stakeholders on different charging strategies.

We expect

companies to adhere to our overarching charging principle that tariffs should be cost-reflective.

We will

publish the outcome of our charges consultation later in 2008.

Setting price limits

Integrating climate change and sustainability in the price review

As the economic regulator of water companies in England and Wales, we set limits every five years on the prices that companies can charge their customers. Many factors affect the way the water and sewerage sectors operate, including climate change, and we take these into account when we set price limits.

In November 2009, we will set price limits for the years 2010-15. We have already set out our price review methodology and issued business plan information requirements. In August this year, each company must produce and submit to us detailed plans for all aspects of its business for the period until the end of March 2015. The plans must take full account of the challenges of climate change, embedding solutions into companies' day-to-day activities.

An innovative aspect of our approach to setting price limits is to place greater emphasis on the need to take a longer-term view of climate change and sustainability. Last year, we asked each company to set out its long-term plan for the next 25 years in a strategic direction statement. Each company's business plan must be consistent with its strategic direction statement.

We also introduced the 'overlap' programme as part of the price review, which encourages companies to take greater ownership of their long-term plans. This allows projects that begin in the period 2010-15 to end in the following five-year period. Extending the time horizon enables companies to identify the optimal investment pattern over time. This also promotes a phased approach to meeting the challenges presented by climate change.

Almost all of the subject areas in this policy statement will influence the price review. For instance, both asset resilience and carbon emissions feature prominently in our price review methodology paper. We anticipate that the water and sewerage sectors will address many of the key challenges presented by climate change in an appropriate, evidenced and responsible manner. We will set price limits that protect consumers' interests, both now and in the future, by taking account of climate change.

We have

required companies to produce 25-year strategic direction statements that place long-term planning in the context of climate change. In addition, we have introduced an overlap programme that encourages a phased approach towards investment planning and responding to climate change.

We expect

companies to address the challenges of climate change adaptation and mitigation in their business plans.

We will

protect consumers' interests, both now and in the future, by making sure that climate change and sustainability are reflected in the price review process.

Consumer expectations and behaviour

Protecting consumers' interests under a changing climate

The water and sewerage sectors' response to challenges presented by climate change will interact with consumers' expectations of how these challenges will be met. Consumers may feel the impact of climate change through the levels of service they receive and the price they pay for water and sewerage services.

As service providers, it is essential that the water companies focus their efforts on fulfilling consumers' needs both now and in a changing climate. As a regulator we must also reflect consumers' expectations and priorities in the way we regulate and set policy.

Consumer expectations are not static, and as the effects of climate change become increasingly apparent it is likely that consumer views will also change. Companies need to remain aware of this when planning for the future.

Along with other stakeholders, we have carried out extensive work with consumers on how they see the water and sewerage sectors. Consumers consistently value a secure and safe supply of water above all else. Their priorities are clear and delivering these priorities is likely to become increasingly challenging under certain climate change scenarios.

Consumers expect good service from their water company. We are currently looking at ways to encourage companies to improve service to consumers by developing new consumer experience measures and through changes to our overall performance assessment. Good service to consumers could also have a positive effect on climate change mitigation. A 'right first time' approach when dealing with problems will reduce the need for additional communications, journeys and, as a result, resources.

Consumers should have the opportunity to form a robust view of how climate change affects the water and sewerage sectors and, therefore, understand the need for any changes in behaviour or expectations. An example of how consumer behaviour and climate change are linked is discussed in the consumer charges strand on page 23. We will use our influence, where appropriate, to increase consumer awareness in this area.

We have

carried out extensive research into consumer expectations. Topics included prices and service levels in the context of wider issues such as climate change.

We expect

companies to engage with consumers and take account of their views when formulating their business plans and their long-term strategic aspirations.

We will

continue to ground our policies in a manner that is consistent with consumers' expectations and we will regulate in a way that protects consumers' interests both now and in the future.

4. Conclusions

Adaptation	What we have done	What we expect	What we will do
Water resources	We have worked with the Environment Agency on guidance and are currently reviewing water resource management plans.	We expect that companies will seek to understand and plan for the impact of climate change on both the supply of and demand for water resources.	We will work with stakeholders to develop improved evidence and guidance for long-term water resource planning.
Leakage targets	We have monitored leakage performance since 1997 and researched the effects of different leakage strategies on the environment.	We expect companies to meet robust leakage targets set as part of a wider long-term strategy to maintain security of supply.	We will ensure that leakage targets take full and proper account of external environmental factors, including the impact of GHG emissions.
Water efficiency	We have set voluntary water efficiency targets and this summer we are consulting on revised targets for inclusion in the next price review.	We expect companies to consider carefully the role of water efficiency when planning how to balance supply and demand now and in the future.	We will continue to contribute proactively to the debate on water efficiency and will include water efficiency targets in the 2009 price review.
Water quality and treatment	We have encouraged companies to take a long-term view of how they will treat raw water and sewage in a changing climate.	We expect companies to understand and act on the impacts that climate change will have on water and sewage treatment.	We will work with other regulators and stakeholders to influence the debate surrounding the tension between climate change mitigation and improving local water quality.
Maintaining serviceability	We have worked with the water and sewerage sectors to develop a suite of indicators for long-term serviceability.	We expect companies to continue reporting clear and accurate data that shows how their assets are performing and to develop forward-looking asset management plans to maintain serviceability.	We will work with the water and sewerage sectors to identify the right set of measures for tracking long-term serviceability of assets in a changing climate.
Drainage	We have participated actively in the Government's water strategy consultation on improving surface water drainage, and have published guidance for companies on their approach to drainage standards.	We expect companies to take climate change into account when maintaining and building sewerage networks.	We will publish our review of sewer flooding 'at risk' registers later this year and promote improved understanding of flood risks.
Resilience	We have produced an analytical framework for assessing the resilience of assets to flooding and evaluating intervention options.	We expect companies to use this framework to understand and protect their assets and services.	We will publish a wide-ranging, fact-based summary of climate change adaptation in the water and sewerage sectors after the 2009 price review.

Mitigation	What we have done	What we expect	What we will do
Carbon management	We have included the reporting of GHG emissions in our general reporting requirements.	We expect companies to understand and take responsibility for their own GHG emissions.	We will develop reporting on GHG emissions not covered by the CRC and will consider the case for further policy instruments in this area.
Carbon in cost-benefit analysis	We require companies to include the shadow price of carbon in their CBA methodology as part of the price review process.	We expect water companies to consider low-carbon investment options.	We will review the impact and effectiveness of including the shadow price of carbon after the 2009 price review.
Catchment and land management	We have outlined a mechanism to encourage companies to work co-operatively with those who share their catchments to address raw water quality issues.	We expect companies to manage their own land in a responsible and sustainable manner, and we expect companies to understand the influences on raw water quality within their catchments.	We will support companies as they seek to identify polluters and secure action to safeguard raw water quality.
Renewable energy	We have outlined further details of our position on renewable energy generation in PR09/14, 'Treatment of renewable energy'.	We expect companies to consider using renewable energy as part of their wider mitigation strategies.	We encourage the self-generation of renewable energy when there are natural synergies with a company's appointed business activities and it can be shown to be cost beneficial.

Overarching issues	What we have done	What we expect	What we will do
Sustainability	We have made 'taking a long-term view of sustainability' a key objective of our new strategy.	We expect companies to develop their business plans within a long-term framework of sustainable service delivery for consumers.	We will strive to improve our own sustainable obligations in both our own operations and policies.
Competition and innovation	We have incentivised innovation by setting efficiency targets and we have reviewed a wide range of options for promoting competition.	We expect companies to address the challenges of climate change by seeking innovative solutions throughout their organisations.	We will seek ways to stimulate innovation further by introducing competition progressively where it benefits consumers.
Consumer charges	We have consulted stakeholders on different charging strategies.	We expect companies to adhere to our overarching charging principle that tariffs should be cost-reflective.	We will publish the outcome of our charges consultation later in 2008.
Setting price limits	We have required companies to produce 25-year strategic direction statements that place long-term planning in the context of climate change. In addition, we encourage a phased approach towards investment planning.	We expect companies to address the challenges of climate change adaptation and mitigation in their business plans.	We will protect consumers' interests, both now and in the future, by making sure that climate change and sustainability are reflected in the price review process.
Consumer expectations and behaviours	We have carried out extensive research into consumer expectations. Topics included prices and service levels in the context of wider issues such as climate change.	We expect companies to engage with consumers and take account of their views when formulating their business plans and their long-term strategic aspirations.	We will continue to ground our policies in a manner that is consistent with consumers' expectations and we will regulate in a way that protects consumers' interests both now and in the future.

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