

Water today, water tomorrow

Ofwat's climate change adaptation report

About this document

On 3 March 2010, we were directed by the authority of the Secretary of State to provide a report on climate change adaptation. This document, and the technical report which accompanies it, is our response. We set out the key risks of climate change to our functions and explain what we are doing to deal with those risks.

Adaptation means making changes that help us cope with the effects of climate change. It can be used to describe institutional as well as physical adjustments. It is different from mitigation, which means action to reduce greenhouse gas emissions.

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1. Introduction

We are the economic regulator of the water and sewerage sectors in England and Wales. [Our duties](#) are laid out in statute, primarily in the Water Industry Act 1991 (as amended). The companies we regulate are responsible for delivering water and sewerage services to consumers.

Climate change presents serious challenges to the water and sewerage sectors. These range from changes to the balance of supply and demand from warmer, drier summers, to more frequent overwhelming of drainage systems because of heavy rainfall.

Our role is not to deliver adaptation on the ground. The companies we regulate must understand the risks of climate change themselves and plan to deal with those risks to service in a sustainable way. As an economic regulator we can:

- **enable adaptive action** – by setting the right regulatory incentives to bring about effective, efficient and equitable adaptation;
- **build adaptive capacity** – by improving our own understanding and the evidence base available to the companies; and
- **monitor and evaluate** – by measuring outcomes in the sectors and the companies' performance to inform our regulatory actions.

Our most important role is to provide the right regulatory incentives to enable the companies to adapt to climate change, and take action if they fail to meet their obligations.

This document explains how we do this and how our work to reform the way that we regulate will further enable climate change adaptation. More information and detail can be found in the technical report which accompanies this report.

Our strategic aim is sustainable water – or 'water today, water tomorrow'. In order to achieve this, we have to consider the long-term risks to service. [Our strategy](#) includes climate change as one of the key challenges that we must address.

We set out the risks to the sectors from climate change in our [climate change policy statement](#), which we published in July 2008. This adaptation report, which follows Defra's guidance, is based on a robust re-evaluation of the risks, and how our regulatory system encourages effective adaptation and reflects the greater understanding that we now have. While our regulatory process incentivises adaptation, there are also some barriers that need addressing to enable adaptation that is effective, efficient and equitable. Change will be required by companies, regulators and wider stakeholders. In this document, we explain the part we will play.

2. What are the risks to us?

Because it is the companies we regulate that are primarily responsible for responding to climate change risks, our relationship with climate change is inherently indirect. The diagram below illustrates the relationship between climate and our functions.



We recognise the need to understand the biggest risks that climate change poses to the sectors, in order to inform our regulatory approach. So, to improve our understanding we carried out an assessment of climate change risks in the sectors and used this to determine which might affect the successful operation of our functions.

Climate change can adversely affect our functions in three ways.

1. **Directly** (by hampering our day-to-day functions). Our assessment has concluded that these risks are very minor.
2. **Indirectly**, by affecting the views and decisions of stakeholders in a way that influences our work. These risks relate to our internal resources and capacity. They are managed as part of our corporate processes.
3. **Indirectly**, by affecting the ability of the sectors we regulate to deliver sustainable water and sewerage services over the long term.

This last category is by far the most significant and this document focuses on these risks. We can only fulfil our functions successfully if the companies we regulate are able to adapt to climate change.

In recognition of the long-term nature of the sectors, we focused our assessment on risks up to the 2050s. We utilised the UKCP09 scenarios, which represents the best available science and is consistent with the approach that others have taken in their own assessments. We prioritised all the climate change risks we identified in this period as high, medium and low based on the probability of the risk materialising and the magnitude of the impact in terms of cost or service. These are shown below.

High-priority risks	Medium-priority risks	Low-priority risks
Reduction in surface water resource yields in summers	Increased demand for potable water	Increased odour problems
Reduction in groundwater resource yields in summers	Increased risk of coastal flooding of company assets	Changes in water available for hydro power generation
Increases in multi-year droughts	More soil moisture deficit (SMD) driven leaks and bursts	Increases in fires
Increases in single-year droughts	Increased raw water demand	Increased pollution in raw water
Increased risk of company assets flooding	Increased sewer blockages because of low flows	Increased algal blooms
Reduced river flows require increased discharge constraints	Increases in waterborne diseases	
Increases in combined sewer overflow (CSO) discharges	Increased risk of power outages	
Increased sewer flooding	Accelerated asset deterioration	

We also identified some opportunities. These include:

- fewer frost driven bursts and leaks;
- increased potential for storage of surface water in winters; and
- increases in sewage treatment efficiency.

In the short term, we do not expect the low-priority climate change risks to drive any significant changes in service, investment or operational expenditure. Medium- and high-priority risks are those that may cause a significant cost or service impact on customers in some areas, particularly if they are combined. So, we have focused on these.

The most important risks relate to:

- water supply and demand;
- asset resilience;
- discharge of wastewater to the environment; and
- the coping capacity of sewer systems.

The significance of these risks over the next few decades cannot be underestimated. There are likely to be financial costs associated with climate change if negative impacts on customers and the environment are to be avoided. The actual timing and impact of these costs on customers' bills will depend on:

- the efficiency of the companies;
- the magnitude of climate change; and
- other future circumstances.

3. How do we enable adaptation?

In line with [Defra's statutory guidance on adaptation](#), we carried out a detailed assessment of the underlying regulatory framework to understand how it enables adaptation. This work built on the risk assessment we carried out and explored barriers and interdependencies. It also explored the role we play as an economic regulator.

Our regulatory system enables adaptation in a number of ways. We have set out examples below.

- The system of price reviews provides a set of incentives for the companies to plan effectively and efficiently to deal with risks to service (including climate change) over the long term. This has worked well since privatisation to improve service and address emerging risks in the sectors.
- The cyclical nature of price reviews allows for regular reappraisals of performance and activity, which can take account of improved information and emerging risks such as climate change.
- Mechanisms such as the change protocol ensure that we have flexibility to react to significant changes that occur between price reviews (for example, updates to climate change projections).
- We monitor the service companies provide and we have enforcement powers to secure compliance if they fail to meet their obligations. This provides continual incentives for the companies to adapt to cope with risks to service, such as those from climate change.
- Key performance measures we use allow us to monitor adaptation progress. For example, serviceability indicators tell us how the networks are coping with climate change and other threats. Service indicators and measures of customers' satisfaction will show how successful the companies are in adapting to climate change.

And we have taken a number of steps over recent years that better enable adaptation. For example, in 2009 we introduced the revenue correction mechanism to remove a disincentive for the companies to reduce overall demand.

We identified a range of interdependencies that will influence adaptation in the sectors. Other regulators cover drinking water and environmental quality regulation and legal requirements, such as the water resource management planning process. So, we rely on the UK and Welsh Governments, the Environment Agency and the Drinking Water Inspectorate (DWI) in particular to continue to manage their policies and regulation in a way that enables adaptation.

4. What needs to change?

We have identified a number of potential barriers and constraints that might mean adaptation is not as efficient or effective as it could be.

- **Uncertainty.** We face significant and unavoidable uncertainty about climate change impacts in the UK. This could result in wasted resources, ineffective solutions or paralysis. It can also make it difficult to produce robust, long-term business cases for adaptation.
- **Justification.** It is difficult to define and measure adaptation outcomes and arrive at economic justifications for adaptation actions because it is difficult to quantify and value benefits that will occur far in the future. This is a problem for the companies when preparing their business plans and a problem for us when we consider policy options, our incentive framework and the companies' investment proposals.
- **Cost.** Adapting to climate change will mean additional investment in some areas. As customers will pay for this investment we have to make sure that it delivers legitimate benefits to those customers. Adaptation must be efficient in order to ensure it is socially and economically sustainable. The overall affordability of water and sewerage bills is likely to influence the pace of adaptation.
- **Competing objectives.** Our risk assessment indicates that climate change is likely to exacerbate conflicts of interest between society, the economy and the environment. In these cases, careful balancing of social, environmental and economic interests and trade-offs will be required.
- **Changing circumstances.** Other future changes that are unrelated or only partially related to climate change (such as demographic shifts) will also have an impact on adaptation in the sectors, add further uncertainty and can exacerbate the risks.

These barriers can only be fully addressed by actions across stakeholders. We can help to address some of them with the changes we are making to the way we regulate.

5. What are we doing to meet future challenges?

We have three main areas of response to the challenges and barriers associated with climate change adaptation.

1. Our future regulation programme will define the part we can play in helping the sectors tackle the challenges they face.
2. Further actions, which focus specifically on adaptation.
3. Highlighting interdependencies where others need to act.

5.1 Future regulation programme

We are reforming our regulatory framework to build on the successes of the existing system while addressing the challenges of the future. This work is known as the future regulation programme.

The programme should help enable better adaptation. For example, the aim of our [future price limits project](#) is to establish a price limit framework that encourages:

- more innovation, including to tackle challenges posed by climate change;
- greater efficiency in delivering solutions such as more resilient infrastructure;
- the right investment at the right time and place to ensure the most appropriate and cost-effective response; and
- better use of water resources.

The framework needs to be flexible enough to enable the companies to finance the investment they need to deliver sustainable services; this means being able to cope with the challenges of the future, including climate change.

Similarly, our [regulatory compliance project](#) aims to establish a risk-based approach to monitoring and securing compliance that reduces the overall regulatory burden and focuses regulatory effort on areas of high risk. We will regulate differently in a risk-based approach, depending on:

- the materiality of the risks; and
- how successfully companies are at managing them.

This fits well in the context of climate change.

Other projects in the programme help address particular barriers and interdependencies we have identified. For example, our [future water charging project](#) helps address issues of affordability and bad debt. It also considers what we can do to reduce waste of water, and so has significant potential to help to address the risks from climate change to the balance of supply and demand. Another key project seeks to enable more [sustainable solutions to drainage](#), which is an area where there are a range of interdependencies and significant uncertainty.

Market reform has potential to deliver further adaptation benefits. For example, introducing more competition into the [retail markets](#) should increase the incentives on retailers to work with their customers so that they need to buy less water from wholesalers. Similarly, stimulating more [abstraction and water trading](#) should incentivise more efficient use of water resources by helping to reveal the value of water.

5.2 Further actions

Our future regulation programme will help enable adaptation and is an important part of our response to the risks from climate change. We have also identified a range of more specific actions. Over the next two years we will:

- improve our internal knowledge and understanding of climate change adaptation;
- assess the companies' progress based on their adaptation reports and focussing on the biggest areas of risk and uncertainty;
- update guidance for improving service resilience to natural hazards;
- review serviceability measures and look at how the capital maintenance planning common framework works for climate change risks;
- revise our climate change policy statement to reflect our improved understanding; and
- set out our expectations for adaptation investment at future price reviews.

We will monitor progress on adaptation in the sectors using existing performance measures (in line with the risk-based approach being developed as part of our regulatory compliance project). We will reappraise our risk assessment and action plan periodically to reflect changing knowledge and circumstances.

5.3 Interdependencies

There are a number of areas where other stakeholders need to act so that adaptation is effective, efficient and equitable.

- We need more sustainable solutions to urban drainage in order to cope with climate change. We are helping to do this in our sustainable drainage project.
- We will continue to need an up-to-date, independent and credible underpinning evidence base that is accessible to stakeholders.
- The future impact of climate change on the environment needs to be understood. This is particularly relevant for abstraction and water quality.
- Suppliers and infrastructure operators across all sectors need to play their part in adapting to climate change so that critical services such as water supply can be maintained.

Many of these issues are led by other parties who are also our stakeholders. Others are led by us but require collaboration or support from stakeholders. So we are engaging with our stakeholders to make sure our work and theirs is optimised to deliver the best outcomes.

5.4 Summary of actions

The table below illustrates the main regulatory mechanisms and future work that help enable the companies to manage the high- and medium-priority climate change risks we have identified. Some actions, such as the price review framework and improving understanding in the sectors, will influence responses to all of the risks.

Risk	Existing measures managed by us	Future work	Measures managed by others
Reduction in surface water resource yields in summers Reduction in groundwater resource yields in summers Increased demand for potable water Increased potential for storage of surface water in winter	Security of supply index Notified item for water resources and climate change Revenue correction mechanism Water efficiency targets Sustainable economic level of leakage Metering policy	Establish our approach for the next price review Valuing water Future water charging Wholesale market development	Water resource management plans (Environment Agency) Abstraction licensing framework (Environment Agency)
Increases in single-year droughts Increases in multi-year droughts	Security of supply index Notified item for water resources and climate change	Future water charging Valuing water Service resilience guidance	Water resource management plans Drought plans (Environment Agency)
Increased raw water demand	Supply/demand balance measures	Valuing water	Abstraction licensing framework (Environment Agency)
Increased risk of company assets flooding Increased risk of coastal flooding of company assets	Provision for resilience	Service resilience guidance	Resilience of critical national infrastructure (Cabinet Office)
Increased sewer flooding Increased sewer blockages because of low flows	Serviceability Service incentive mechanism Measurements by service outcomes (sewer flooding)	Establish our approach for the next price review Sustainable drainage project	Provisions of the Flood and Water Management Act 2010 (Defra/local authorities)
Increases in combined sewer overflows (CSO) discharges Reduced river flows require increased discharge constraints	Wastewater quality programme (in price reviews)	Sustainable drainage project	Quality regulation (Environment Agency) Quality directives (EU)

More soil moisture deficit (SMD) driven leaks and bursts Fewer frost driven bursts and leaks	Serviceability Sustainable economic level of leakage	Look at how the capital maintenance common framework operates with climate change risks	Building regulations
Accelerated asset deterioration Increased sewerage treatment efficiency	Serviceability	Look at how the capital maintenance common framework operates with climate change risks	Quality regulation (Environment Agency and Drinking Water Inspectorate)
Increased risk of power outages	Provision for resilience	Service resilience guidance	Resilience of critical national infrastructure (Cabinet Office) Energy sector resilience measures Security and Emergency Measures Directive
Increases in waterborne diseases	Water quality programme (in price reviews)		Drinking Water Inspectorate Health and safety standards (Health and Safety Executive)

6. Conclusions

To achieve our aim of sustainable water, we must consider all the future challenges facing the sectors. This means that we must take into account in the way we regulate the significant risks that climate changes poses.

We want to have a set of incentives in place that enable effective, efficient and equitable adaptation. Our existing regulatory framework already enables and incentivises the companies to adapt. But we are also making changes to the way that we regulate to ensure that the right level of adaptation takes place in an efficient way. Our future regulation programme will:

- improve incentives;
- develop understanding; and
- address barriers.

We will also carry out further actions that help to build our internal capacity to adapt and better enable adaptation within the sectors.

The companies we regulate must understand the risks from climate change on their services and take action where appropriate. Other regulators and wider stakeholders also have important parts to play in adapting to climate change.

We will use this report, and the adaptation reports others have produced, as a basis for discussion with stakeholders. By doing this, we hope to identify further areas in which we can improve our approach to adaptation.

We welcome views on our report and the actions we have outlined. We will continue to work with all our stakeholders as we address the risks from climate change in the sectors and work towards sustainable water.



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