

Water today, water tomorrow

# Allocating risk and managing uncertainty in setting price controls for monopoly water and sewerage services – a discussion paper



## About this document

This document discusses the risk environment in which our water and sewerage sectors operate. It looks at who can best manage risk and how we might use our regulatory tools – particularly price controls – to allocate that risk efficiently.

It explores:

- how risk should be defined, as applied to the water and sewerage sectors in England and Wales;
- the different types of risk and their potential impacts;
- how risk might be best allocated;
- how we can develop incentives to effectively manage risk; and
- how risk allocation may need to change if the future structure of the water and sewerage sectors were to change significantly.

It also includes discussion of how uncertainties might be handled within price setting.

The thinking in this document has been informed by:

- roundtable discussions with members of our [future regulation advisory panel](#);
- comments from stakeholders, including those we received at our sustainable water event in March 2010 and future price limits workshop in July 2010; and
- a [report on risks and incentives](#) that we commissioned from Europe Economics.

This is one of a series of detailed discussion papers exploring a specific aspect of price setting that we are considering as part of our review of price controls.

In '[Beyond limits – how should prices for monopoly water and sewerage services be controlled?](#)', which we published in July 2010, we explained how and why we are reviewing the way we set price controls.

The aim of these early discussion papers is to obtain the views of our stakeholders and to inform more specific debate on approaches and tools as the project progresses. They are not intended as a definitive statement of our views or as a formal consultation. Details of how to engage in the discussion are set out in chapter 8.

We will use the feedback we receive on the issues we discuss in this document, and others, to inform our overall approach to price setting. We will formally consult on our price setting methodology, based on the approach we adopt, in 2012.

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## 1. Introduction

Most people in England and Wales receive their water services from one of 22 licensed regional monopoly suppliers and their sewerage services from one of 10 licensed regional monopoly suppliers. Only very large business customers are able to choose their supplier.

Since the water and sewerage sectors were privatised in 1989, it has been our role to regulate the monopoly companies. We have a duty to protect consumers' interests while ensuring efficient companies can carry out and finance their functions.

One of the ways we deliver our duties is to review and set price limits on the basis of an investment and service package that customers receive from their water company. We currently carry out a review of price limits every five years. We completed the last review in November 2009, which covers the period between 2010 and 2015.

Since privatisation, our approach to setting price limits has worked well. It has delivered substantial benefits to both consumers and the environment. For example:

- there is higher environmental compliance, with 98.6% of bathing waters meeting the required standards;
- consumers have access to excellent drinking water, with 99.95% compliance with tough EU standards; and
- by driving out inefficiencies a litre of tap water delivered and taken away costs less than half a penny.

To achieve this, the companies have invested about £90 billion (in today's prices) over the past 21 years – requiring frequent access to financial markets.

But, as we discussed in more detail in '[Delivering sustainable water – Ofwat's strategy](#)', which we published in March 2010, the companies now face a set of very different challenges, including:

- a changing and unpredictable climate;
- population growth, particularly in the south-east of England where water is already scarce;
- economic uncertainty and the consequent affordability issues this raises;
- rising environmental standards, including implementing the EU Water Framework Directive; and
- rising consumer expectations from an increasingly sophisticated customer base.

These challenges are different in nature, scale and complexity from those of the past. They will make delivering sustainable water and sewerage services increasingly challenging. As a result, they may require a different set of responses and fresh approaches from the wider water and sewerage sectors.

We want to build upon the successes of the strong and stable regulatory environment that we have developed over the past 21 years. So, among other things, we will continue to:

- protect consumers' interests, keeping them at the heart of what we do;
- develop long-term approaches to environmental planning to ensure sustainable water and sewerage services now and for the future; and
- provide the regulatory stability necessary for efficient water companies to attract investment from competitive financial markets.

To deliver this, we are exploring through our future regulation programme the part we can play in helping the companies overcome the challenges they face. This includes the way we set price limits, which we are considering as part of our future price limits project.

We want to set price limits that will help us to achieve our vision of sustainable water, allowing us to meet our needs for water and sewerage services while enabling future generations to meet their own needs.

More specifically, we want the way we set price limits to:

- ensure that the best use is made of resources (including water that is discharged into the environment, as well as taken from it);
- ensure that investment takes place at the right price, in the right place at the right time;
- allow the use of regulated markets to enable better choices;
- encourage the companies to understand what their customers want and need over the long term, and respond to them;
- encourage the companies to innovate;
- reveal information that will help us to regulate better and help the companies to manage their businesses in the most efficient way; and
- comply with the five principles of better regulation – accountability, consistency, proportionality, transparency and targeting.

One of the key underlying parts of setting price limits is how risk is allocated – and how uncertainty is handled.

In general terms, risk is the probability and consequence (either positive or negative) of a particular outcome occurring, such as the probability of an equipment failure over a 12-month period, or of a drought over a 10-20-year period. It can also refer to instances where the probability of an event occurring is known, but which may lead to a range of outcomes. Risk is distinct from uncertainty, which is where the probability of an event occurring is unknown.

But in practice, risk often includes elements of uncertainty. For example, it may be possible to estimate the cost of delivering specific outputs, such as cleaner rivers. But, challenges like the impact of a changing climate includes major elements of uncertainty, which means that we do not know whether, and to what extent, our estimates may change. Primarily, this is because we have no previous experience of potentially major increases in the earth's temperature.

Different stakeholders may also view risk in different ways. For example, the consequence of economic risk may be lower demand for water as a result of a recession. While a company and its investors might view this as harmful if it resulted in loss of revenue, society may view it as beneficial if lower demand led to a less water stressed environment.

We want to make sure we understand the range of risks the water and sewerage sectors face, both now and over the long term. In this way, we can ensure that the risk to all stakeholders of a particular undesirable event (or events) occurring and its impact is minimised. We can do this by making sure that the risk is allocated to the party most able to control or manage it – and ensuring they have the incentives to either reduce it or manage it effectively.

Because we want to focus more on incentivising outcomes, we must also acknowledge that the risk of delivering outcomes may be different from the risk of delivering outputs. So, it might be appropriate to put the risk with the companies even though they do not control all of the inputs and outputs.

We know that there are different individuals and organisations that are best placed to manage different risks. For example, the companies would seem to be best placed to manage operational risk (that is, the risk of their own assets failing). This is because they have the most control over those assets, and both the knowledge and the ability to manage them.

So, if a company's assets fail – for example, if a water main bursts and service to customers is interrupted – then it is the company that has to manage the consequences and fix the burst. It may also face a financial risk in the form of a penalty for failing to meet certain obligatory service levels.

But there are other risks that are outside the companies' control. For example, they are not best placed to bear the risk of infraction for failing to transpose EU legislation into national law because they have little or no control over the issue. Instead, it should be Government – in this case, taxpayers – that would bear the risk.

So, this document aims to:

- identify different types of risk and uncertainty;
- identify those that might be best placed to control risk;
- discuss how price controls might allocate risk efficiently; and
- identify briefly some of the ways in which risk can be mitigated.

As well as discussing some of the tools that can be used to deal with risk, we also consider how we should allocate risk in our price control process. To prompt discussion and encourage debate, we have set out a table on page 18 that suggests who is best placed to manage different types of risk in the water and sewerage sectors.

We welcome your views on this, especially in relation to any alternative allocation. We will use this information to formulate how we will allocate risk when we next set price limits.



## How risk and uncertainty links with other areas of the future price limits project

There are very close links between risk and the other issues we are considering in our future price limits project.

- **Incentives.** The way we allocate risk is linked strongly to incentives. The extent to which we expose stakeholders to risk can provide incentives to manage both the probability of the risk occurring and the extent of its consequence.
- **Form of the price control.** This is an important tool for allocating risk. Our approach to risk will need to take decisions on the form of the price control into account. For example, a particular form of price control might require different risk mitigation tools.
- **Regulated and unregulated business.** How we define regulated and unregulated activities, and our treatment of them, may affect the allocation of risk.
- **Outcomes, outputs or inputs.** The allocation of risk can affect the delivery of desired outcomes. If risk is not allocated correctly, it can lead to an inefficient outcome or the failure to deliver an outcome at all. The way that we define, and monitor the delivery of outcomes, outputs or inputs can influence the risk that stakeholders face.
- **Cost assessment and cost recovery.** The way we assess costs and allow them to be recovered in price limits can affect the allocation of risk. For example, assumptions we may make about how capital expenditure is financed can alter the allocation of risk between customers and investors.
- **Risk and the cost of capital.** The way in which investors are remunerated and the risk mitigation measures we may put in place in a price control will affect the allocation of risk. For example, using notified items to address certain specific risks can alter the balance of risk between customers and investors.

We also recognise the effect on risk and uncertainty that our work on other projects may have, including regulatory compliance, future water charging and market reform.

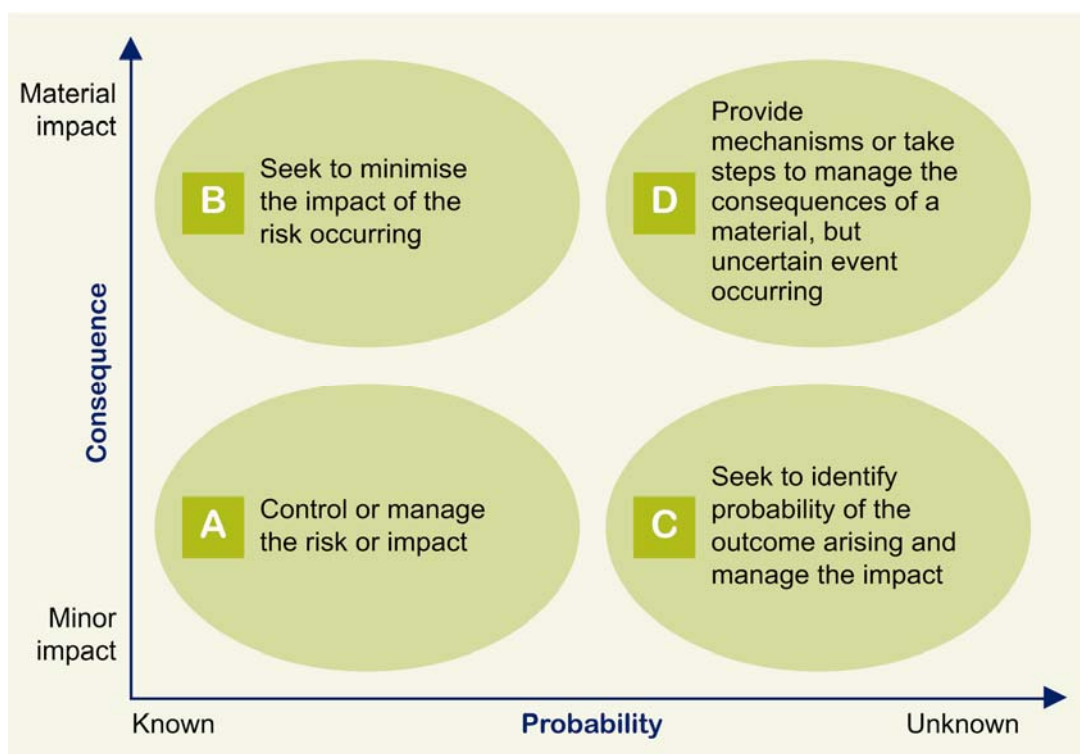


## 2. What do we mean by risk?

1. Before we can think about allocating risk, first we have to understand what risk is, and distinguish between risk and uncertainty. On page 5, we defined risk in general terms as “the probability and consequence (either positive or negative) of a particular outcome occurring”. Uncertainty, because of its very unpredictability, is a much less tangible concept.
2. In reality, it is difficult to define the two terms clearly. There is likely to be a spectrum between those risks where probabilities can be assessed, and uncertainty where the probability of an outcome arising is unknown. In terms of risk assessment, there are margins of error even when assessing well-understood risks, which may include for example, asset failure rates.
3. Despite this, it may be possible to assign broad qualitative probabilities – such as high, medium and low – even in the case of the most uncertain possibilities, such as the consequences of sustained climate change. Scenario planning can also be used to assess the impact of alternative outcomes.
4. It is worth noting that the way risk is allocated may have varying degrees of significance for different stakeholders, at different stages of the value chain, and at different times. So, the more significant the outcome is, both in terms of scale and in damage (or benefit), the more important it will be to ensure the risk is allocated correctly.
5. The significance of different risks will also vary and may change over time. So, where we are regulating monopoly services, for example, it may be appropriate for us to be concerned with the risk of operational failure because of its impact on the delivery of services to customers who have no alternative.
6. This may change as parts of the value chain become more contestable. This is because if a customer can choose an alternative supplier, then that may be enough protection for them, and enough incentive on the operators, to ensure operational risk is handled appropriately.
7. We also note that change itself has an impact on risk – particularly in the areas of regulatory and political risk. In its current form, independent economic regulation has done much to reduce the exposure of the water and sewerage sectors to political risk.

8. Similarly, our stable and transparent approach to economic regulation has also reduced regulatory risk. As regulators and policymakers review their roles in the sectors, we are very aware of the need for us to do what we can to ensure that political and regulatory risk do not increase unduly.
9. To illustrate this, the diagram on page 10 highlights the spectrum between risk, uncertainty and materiality of the outcome. Risks are on the left hand side of the diagram; uncertainties are to the right where probabilities are more difficult to assign. We have set out some examples of the risks and uncertainties that might arise in each quadrant of the chart.
  - **Quadrant A** concerns risks with a reasonably understood probability, but a relatively low impact. Examples may include asset failures, such as a burst pipe that causes a leak, or operational issues that have a relatively minor impact on service to customers or the environment. In such cases, we might expect the company to have appropriate risk management procedures in place that aim to minimise the chance of the risk occurring, or managing its impact should one arise.
  - **Quadrant B** represents those risks where the probability is reasonably well understood, but that have a material impact on outcomes. This may include, for example, the impact of extreme weather events on service to customers or the environment, like the impact of flooding on the Mythe water treatment works in 2007 when 350,000 customers in the Gloucester area were left without running water for up to 17 days. In such cases, it may not be cost-beneficial to build assets that are capable with dealing with 1 in 200-year storm events. But, good planning and contingency arrangements could mitigate the impact of the storm event on service delivery. So, to make the Mythe treatment works more resilient, Severn Trent initially installed temporary defences at its own expense. We allowed funding for a permanent solution at the 2009 price review. More generally, this incident acted as a driver for the companies to improve resilience so that customers can continue to receive something close to their usual service even in extreme circumstances.

- **Quadrants C and D** represent those circumstances where the probability of the event occurring is less well understood or less certain, but with an impact that ranges from relatively minor to significant. Under these circumstances, it will be possible to assign a qualitative assessment of the likelihood of the risk arising and use risk management techniques to manage the impact of should one arise. Such uncertainties may represent the consequences that result from acts of terrorism and other unforeseen events, such as a crisis in the financial markets. From a company perspective, political and regulatory risk may also fall into these quadrants.



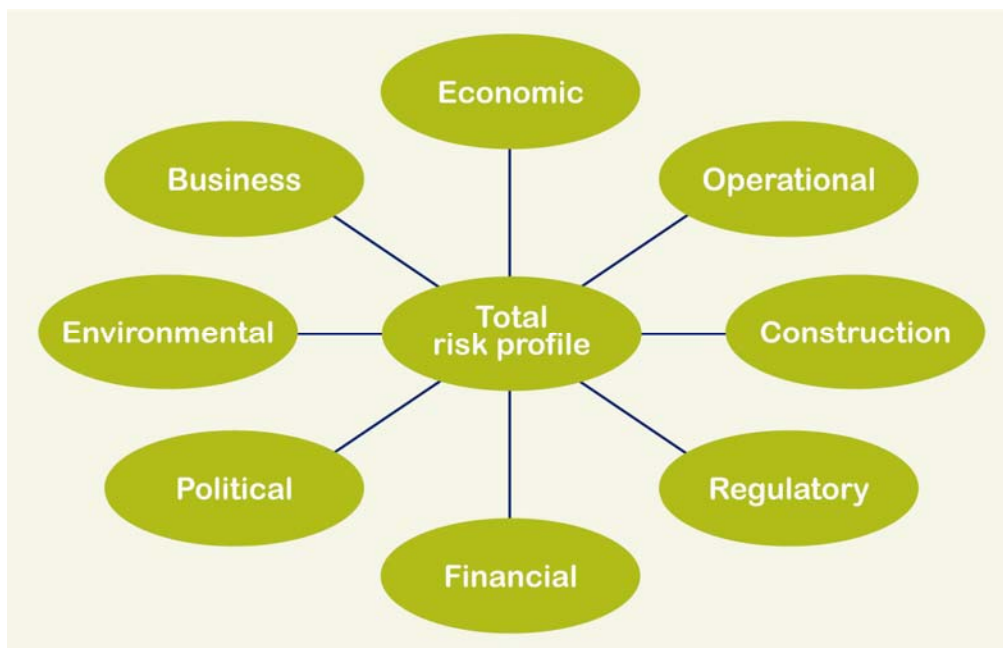
### 3. Why are we considering this issue now?

10. In ‘Beyond limits – how should prices for monopoly water and sewerage services be controlled?’, we set out the overall aims of our review of the way that we set price controls. Without introducing unnecessary uncertainty, we want a flexible framework for price controls that:
  - enables the companies to finance the investment they need to deliver sustainable services;
  - allows other regulatory tools to be developed in the future, such as introducing market mechanisms where they may help to deliver sustainable water; and
  - drives monopoly companies to deliver water and sewerage services efficiently, where ‘efficiently’ means that services should cost no more in social, economic or environmental terms than they need to.
11. As part of our future price limits project, we are considering a number of topics. Each represents part of the price control mechanism that is of critical importance in contributing to the delivery of sustainable water. Risk is one of these topics.
12. As with incentives, the allocation of risk is fundamental to price limit setting. We will only achieve our vision of sustainable water if we can ensure that we have a good understanding of the different types of risk, and that we have the tools to allocate that risk efficiently.
13. In common with other areas of the economy, the water and sewerage sectors are subject to a variety of risks. The nature and extent of these risks, and the extent to which different stakeholders in the sectors are exposed to them, will vary.
14. In seeking to allocate risk efficiently we need to have regard to the impact of allocation on:
  - lower cost ways of doing things (**‘productive efficiency’**);
  - the best way to use scarce resources (**‘allocative efficiency’**); and
  - new and better ways of doing things (**‘dynamic efficiency’**).

15. So, the allocation of risk goes beyond seeking to minimise financing costs alone, and is central to delivering sustainable water. It relates to the efficient use of resources in its widest sense, ensuring that water is abstracted in an efficient manner that avoids undue environmental damage. It also relates to social sustainability and the risk that society and taxpayers are willing to bear – not just the cost customers are willing to pay through their water bills.
16. The impact of a risk on the delivery of sustainable water may be complex and involve trade-offs. For example, operational failure may have a damaging effect on the environment (perhaps because of pollution such as discharges into rivers) or on customer service. But the cost associated with reducing the probability of the operational failure happening in the first place might have an impact on the affordability of customers' bills, or on the sectors' carbon emissions.
17. From a regulatory point of view, we need to focus on the risks that have the most material impact on the delivery of sustainable water, rather than its impact on a particular party. This reflects a move to a more risk-based approach to regulation on our part, which we are considering as part of our [regulatory compliance project](#).

## 4. What are the risks faced by the water and sewerage sectors?

18. Risk can be categorised in many ways. Some categories and types are specific to the water and sewerage sectors (specific risks), while others are faced by all parts of the economy, but to a greater or lesser degree (systematic risks). Often, different types of risk are linked or may represent a collection of more specific risks.
19. For example, operational events may pose both environmental and financial risks. So, if a sewerage treatment plant were to fail and caused environmental pollution, the company responsible would face not only the cost of repairing the asset failure, but potentially a fine as well.
20. We want to understand how these risks interact so we can allocate them correctly. Within this discussion paper, we identify eight broad categories of risk, which cover the range that the water and sewerage sectors may face. We have outlined these categories in the diagram below.



21. Within each of these categories lies a broad range of risks. We describe these below, giving examples of risk for each category. It is not an exhaustive list, and we welcome your comments and suggestions on it. There are interdependencies between the different types of risk, which we also explain below.

<b>Risk type</b>	
<b>Operational</b>	<p>These risks affect the day-to-day delivery of water and sewerage services. They arise from losses that result from:</p> <ul style="list-style-type: none"> <li>• events caused by asset condition or asset failure;</li> <li>• inadequate or failed processes, or systems; or</li> <li>• external events.</li> </ul> <p>Operational risks could result in general service failure, including:</p> <ul style="list-style-type: none"> <li>• loss of amenity;</li> <li>• environmental damage; or</li> <li>• inconvenience to customers through loss of service.</li> </ul> <p>The consequence of such risks should generally be well known and quantifiable, unless it is the result a new or emerging technology or process.</p>
<b>Construction</b>	<p>These risks include project delays that impact on achieving specific deadlines. This could have wider implications for the environment, customers or for the wider economy. If the delay results in legal proceedings (for infraction), there may be an impact on taxpayers and Government.</p> <p>Construction risk also includes the risk of costs on a project over-running. This may be the result of:</p> <ul style="list-style-type: none"> <li>• unforeseen circumstances;</li> <li>• poor forecasting; or</li> <li>• poor management.</li> </ul> <p>They may also result from unforeseen or unforeseeable increases in input costs. But in the water and sewerage sectors, where the companies are accustomed to managing construction projects, such risks should be known and forecastable for a large proportion of construction projects.</p>
<b>Business</b>	<p>This is the risk that is inherent in the water and sewerage sectors. Typically definitions of business risk encompass many of the issues described elsewhere in this chapter. In this context, we define business risk to cover the loss of revenue that may arise, for example, from the emergence of new technology, innovation or loss of customers to a competitor.</p> <p>The water and sewerage sectors are regarded as carrying relatively low business risk. This is because the current regulatory framework is stable and provides relatively high revenue certainty.</p> <p>To date, the provision of services by end-to-end vertically integrated monopoly companies and the regulation of end retail prices through a single price control has created the perception of uniform business risk</p>



	<p>across the value chain. This masks inherent variations in the risk profile between different parts of the value chain. These variations will become clearer with a more disaggregated approach.</p>
<b>Financial</b>	<p>Financial risks may arise from issues that affect the whole economy, such as movements in interest rates. They may also arise from other sector-specific effects, such as the regulator’s choice of the cost of capital in price setting or changes in market sentiment for the sector.</p> <p>Financial risk is broadly quantifiable. It can be assessed reasonably well in the short to medium term. In the longer term, an assumption of reversion to the mean may provide the basis for assessment as forward-looking projections become increasingly uncertain.</p>
<b>Economic</b>	<p>This includes both ordinary and extraordinary economic risks. Ordinary economic risks are associated with short- and medium-term economic variables, such as:</p> <ul style="list-style-type: none"> <li>• gross domestic product (GDP);</li> <li>• unemployment; and</li> <li>• inflation.</li> </ul> <p>Extraordinary economic risks are those that may be outside of historic trends. For example, economic uncertainty is currently higher because we are still recovering from a significant recession. But even in such extraordinary times, the risks and uncertainties arising will not continue forever.</p> <p>Both types of economic risk affect water demand (for example, through changes to industrial and domestic demand and the location of that demand). They also affect customers’ ability to pay their bills. But demand for water may be much less income or price elastic than other commodities, which might mean that the sectors are relatively less vulnerable to such risks than other areas of the economy. This risk has been removed in relation to household customers by the introduction of a revenue correction mechanism at the 2009 price review.</p> <p>Economic risks also affect the sectors’ supply chain. For example, inflation may result in higher prices for key inputs. The sectors may be relatively insensitive to short-term inflation pressures given the long lead times associated investment and the long-lived nature of some of the assets. Extraordinary economic events, for example, long periods of very high inflation or deflation, could introduce more significant risks.</p>
<b>Environmental</b>	<p>Environmental risk includes all the different ways in which the water and sewerage sectors may impact on the environment. This includes risks that impact on the availability and quality of water resources. It also includes the impact the sectors may have on the quantity and quality of the raw water because of operational failure. More broadly still, it includes the risk</p>

	<p>that the supply of water and sewerage services uses resources in unsustainable ways, for example by emitting greenhouse gases.</p>
<b>Political</b>	<p>There are different levels of political risk. At either end of the spectrum, there are global and local political risks. In between, there are risks at a European and a national level.</p> <p>European political risks arise from policy decisions within the EU (that may lead to new or amended legislation), and decisions on compliance with existing legislation (such as infraction proceedings), which can lead to potentially unforeseen cost to the sectors.</p> <p>National political risks arise as a result of Government policy at the UK level or at the level of the devolved administrations. This could include Government decisions on changes to the regulatory framework. It also includes legislation that alters the status of the sectors, introduces new environmental costs, or changes in taxation, such as imposing a windfall tax on the companies. Government policies and legislation that introduce greater contestability to the sectors may be included in this category, particularly if they and their implications are not discussed adequately before they are implemented.</p> <p>Political risks may also include more general political attitudes and policy decisions, which are often influenced by wider societal concerns and changing attitudes to risk, for example, in response to specific adverse events such as flooding or major operational failure.</p>
<b>Regulatory</b>	<p>These risks derive from changes to the regulatory framework. It encompasses all aspects of regulation as it applies to the water and sewerage sectors – not just what we do, but also the work of the Environment Agency and Drinking Water Inspectorate. It can also encompass wider health and safety regulation.</p> <p>The extent of such risks depends on the nature and the predictability of change. The regulatory risk that results from the prospect of change is independent of the effects of the changes themselves.</p>

## 5. Who might risk be allocated to?

22. The question of who bears risk is often complex. In some cases, the party that bears the initial risk may not be the same as the ultimate bearer of that risk. For example, a water company may manage an operational risk, but the cost of doing this may be shared between customers and investors because of the price limit that we set as the regulator.
23. If an operational failure results in a pollution incident, investors may face the cost associated with enforcement proceedings and potentially a financial penalty. The company and its Board may suffer reputational damage. Society may face a cost associated with the loss of amenity value from the affected environment.
24. The failure of the Mythe water treatment works in Gloucestershire during the 2007 floods demonstrated that ‘single points of failure’ in the water network could have massive consequences for whole regions<sup>1</sup>.
25. We have set out below the broad categories of parties that bear risks in the water and sewerage sectors. Almost all of groups listed here felt the consequences of the failure of the Mythe treatment works.

### Bearers of risk in the water and sewerage sectors

<b>Customers</b>	Some risk events are likely to affect customer service. For example, operational failures may lead to interruptions in supply. Other risk events may result in higher customer bills now or in the future.
<b>Taxpayers</b>	In some cases, there may be an implicit or explicit part of overall risk allocated to taxpayers. For example, taxpayers meet the cost of any financial penalty if infraction proceedings are brought and are successful. Government may decide that taxpayers should meet the costs associated with other risk events occurring, perhaps if their impact is large or concentrated on particular groups.
<b>Government</b>	The Government is responsible for the legislative framework within which the sectors operate. It also sets – directly or indirectly through implementation of EU law – particular standards the sectors must meet, for example in relation to environmental and quality standards. If these aspects of the framework fail to deliver the desired outcomes, it could affect the Government’s reputation.

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<sup>1</sup> See, for example, the Pitt review: <http://archive.cabinetoffice.gov.uk/pittreview/thepittreview.html>

<b>Society</b>	Society extends beyond customers and taxpayers. It bears much of the risk associated with externalities generated in providing water and sewerage services unless it is somehow internalised in the price that taxpayers or customers pay. For example, operational failure may result in river pollution incidents that do not affect customers or taxpayers, but have a negative impact on society through the loss of the amenity value of the river.
<b>Water companies</b>	The companies are required to comply with the legal obligations placed on them and deliver the outputs or outcomes specified in price limits. Ultimately, it may be other parties that bear the impact of a risk event occurring. For example, customers and society may bear the risks from service failures, while investors bear the financial consequences through reduced returns. Company Boards have a key role to play in managing risk through their fiduciary duties.
<b>Construction companies and/or the supply chain</b>	Companies within the water and sewerage sectors' supply chain may be exposed to risk in a number of ways. For example, in negotiations with the regulated companies there may be a transfer of risk to the supply chain on issues such as operational failure, poor performance, cost overruns and project delays. More generally, the supply chain may be exposed when the companies revise contracts in response to changing circumstances.
<b>New entrants</b>	In general, new entrants into the sectors are likely to bear the same risks as the other water companies. But they also face particular risks relating to barriers to entry, which the other companies do not face. These may be normal business risks (especially where economies of scale and scope exist). But they may also stem from behaviour of the existing companies, or from the way the regulatory framework is applied.
<b>Investors</b>	The sectors have been consistently cash flow negative since privatisation, principally because of the large investment programmes. This means that new investment must be funded from the debt and equity markets. Investors expect to receive a return on their investment that is commensurate with the risk they are taking in, and price controls determine the balance of risk that lies between customers and investors, as well as society and taxpayers more widely.
<b>Regulators</b>	Regulators provide expertise and act in the interests of the sectors' stakeholders under the direction of statute or Government. They carry the reputational risk of their actions and decisions, which have implications for other stakeholders.

## 6. How could risk be allocated in a price control?

26. In order to allocate risk efficiently, it is necessary to have information on:
- the nature and scale of different risks;
  - what affects the probability of risk events occurring; and
  - what affects the impact that is felt when they occur.
27. With poor information, risk cannot be allocated appropriately, and efficient and effective risk management is unlikely. So, when considering this, it is important to ask the following questions.
- What is the likelihood of the risk event occurring?
  - What factors govern whether the risk event will occur?
  - What steps could be taken to reduce the probability of the risk event occurring?
  - What would be the outcome (or possible outcomes) of the risk event occurring? And for whom?
  - What is the predictability of the outcome?
  - What factors govern the likelihood of given outcomes?
  - What steps could be taken to affect the probability of given outcomes?
28. Because services to customers are provided by vertically integrated monopoly companies regulated through a single price control, there is the perception of uniform risk across the value chain. This masks inherent variations in the risk profile between different parts of the value chain. Put simply, there is not enough information available to us as the regulator, or to other parties that bear risk, about the risks within the sectors.
29. Regulating end-retail prices, with no focus on services provided at different stages of the value chain, means that we have not considered which parts of the business are best placed to manage particular risks. Nor have we tailored our regulatory approach to reflect the differences in risk profile at different stages of the value chain. A more disaggregated approach to setting price limits would help to identify variations and allow them to be reflected in price controls.

## Disaggregation of the value chain

In 'Future price limits – possible future structures', we set out three possible structures for the water and sewerage sectors, which included the status quo and two hypothetical future structures. In its [report](#) commissioned by us, Europe Economics discussed the possible allocation of risk under the two hypothetical scenarios.

- The first involved separating retail from wholesale operations, for which separate price controls are set and allowed for entry into the retail, water resources and sludge markets.
- The second provided for more extensive change to the value chain. It includes separate price controls for resources, treatment and the networks, with system operators to co-ordinate network activity, a fully functional trading regime and scope for entry in the value chain.

Under these scenarios, the major change to current risk allocation (as set out in the table on page 24) would be to disaggregate the 'company' into separate business units. This may include, for example, retail and wholesale business units. Each of these business units would have its own inherent risk profile and its own allocation of risk through the price control. The price control would need to ensure risks previously allocated to the company in aggregation were allocated appropriately throughout the value chain.

We discuss a more disaggregated approach to setting price limits in our [discussion paper on the form of the price control](#).

We welcome your views on the impact of a more disaggregated approach on the identification, allocation and management of risk.

30. We also need to understand where risk has been allocated externally to our price setting process, and the implications of this. This might take place through the setting of individual performance or design thresholds, which may be set by Government or regulators, and which may result in different customers being exposed to different levels of risk.
31. For example, setting 1 in 200-year flood event resilience standards for assets that supply 100,000 people will mean that people living in a city with a population of that amount will be protected if the city is supplied by one works. But, they will not be protected if the city is served by two works that each supply 50,000 people.
32. Also, a change in the frequency of future rainfall events because of climate change may mean that the magnitude of a 1 in 200-year flood event will also change. This has the potential to lead to inefficient investment as standards constantly change. These and other issues are discussed in more detail in 'Resilient supplies – how do we ensure secure water and sewerage services?', which we will publish shortly.

33. All price controls have the effect of allocating risk between different parties. We seek to allocate each risk to the party or parties best placed to manage it<sup>2</sup>. This may be the party best placed to reduce the probability of the risk event occurring or the one best placed to reduce the impact of the risk event if it occurs. Allocating risk in this way is consistent with our aim that price limits should drive efficiency, since it effectively allocates a cost to the party best able to minimise that cost.
34. We could use price controls to minimise the risk to which the companies and their investors are exposed. This would drive down the cost of capital and would feed through into lower prices for customers. But if we did this in a way that transferred the risk to customers, then they would face ‘hidden’ costs in the form of additional risk.
35. For example, the companies and their investors could be given greater revenue certainty if we removed financial incentives (in the form of penalties) for poor service performance. But customers and society might bear more risk if, as a result, service failure was more likely to have or had a greater consequence.
36. Allocation of risk should not be seen solely as the allocation of a cost. There are both positive and negative elements to this – some risks even present new opportunities. For example, in a contestable retail market, the retailer bears revenue risk (a form of business risk). The retailer is exposed to the risk that it will lose revenues if it fails to retain customers. But if the retailer wins new customers, as well as retaining those it already has, it will increase its revenues and enjoy additional profit.
37. In allocating risk within the price control we can choose – to some extent – whether to allocate a risk to a particular party, and the extent to which that party is exposed to the risk. It is possible that a given risk may be shared between different parties, with each exposed to differing degrees. We discuss risk sharing arrangements between regulated and unregulated services in more detail in our [discussion paper on regulated and unregulated business](#).
38. The way in which we allocate risk in a price control is linked strongly to incentives. So, if the party best placed to manage the probability of a risk event occurring faced none of the consequences (positive or negative) if the event occurred, it would have no incentive to manage the probability of the event occurring.

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<sup>2</sup> This overriding principle is consistent with statements by the Competition Commission, see for example: [http://www.caa.co.uk/docs/5/ergdocs/ccreport\\_appf.pdf](http://www.caa.co.uk/docs/5/ergdocs/ccreport_appf.pdf)



39. Though the price control mechanism, we can expose parties to the effect of a risk event occurring and provide an incentive to manage the probability of the occurrence. The strength of the incentive will depend on the extent of the exposure (which for any one party may depend on the extent to which risk is shared between different parties).
40. Alternatively, we can use specific incentive mechanisms within the price control to create that exposure. One way we do this is through service incentive mechanism (SIM). We use the SIM to expose the companies to the effects of good or poor customer satisfaction – they gain or lose a percentage of turnover depending on the customer experience they provide.
41. Currently, the companies we regulate and their investors are not exposed to the business risk that organisations in competitive markets face. This is because their revenues are not dependent on them winning and retaining customers. As a result, they have limited incentives to provide the service that customers want, and would normally expect.
42. Different parties may have differing views of various risks, and the extent to which they or others are best placed to manage them. Also, some types of risk may not be wholly within the control of a single party; the ability to take action may depend on the actions of more than one party.

### **Taking a different approach to allocating risk – large projects**

The Flood and Water Management Act (2010) allows for an adapted regulatory framework for large infrastructure projects, including a separate licence for the infrastructure service provider. It was recognised that some future projects in the water and sewerage sectors might need to be carried out over longer periods, be unusually large or cross company boundaries. This will require capital investment in projects where risks are different to those of the companies' current portfolio of investments.

One example is likely to be the Thames Tideway project. The scale and complexity of this project raised issues of planning, design, financing, and construction risk that are different from those normally associated with water company capital investment programmes.

43. The table below suggests a relative ranking of the role of each party in either controlling the probability of categories of risk event occurring, or managing their outcomes within the current regulatory framework. It does not seek to identify who might bear the consequence of risk. Its purpose is to encourage discussion. We welcome a debate around this ranking and any alternative views or comments.

## The role of different parties in managing risk in the water and sewerage sectors

Risk	Stakeholder								
	Central Government	Customers	Regulator	Taxpayers	Society	Company	Supply chain	New entrant	Investors
Political	✓✓✓	✓	✓✓✓	✓	✓	✓✓	✓	✓	✓✓
Regulatory	✓✓✓	✓	✓✓✓	–	✓	✓✓✓	✓	✓✓	✓✓
Economic	✓✓✓	✓	✓✓	–	–	✓✓	✓✓	✓✓	✓✓
Environment	✓✓✓	✓	✓✓✓	–	✓	✓✓✓	✓✓	✓✓✓	✓✓
Operational	✓	✓	✓✓	–	✓	✓✓✓	✓✓	✓✓✓	✓
Construction	✓	–	✓	–	–	✓✓✓	✓✓	✓✓✓	✓
Financial	✓✓	✓	✓✓	–	–	✓✓✓	✓	✓✓✓	✓
Business	✓✓✓	✓	✓✓	–	–	✓✓✓	✓	✓✓✓	✓

**Key:**

- ✓ Some limited role, which may include setting expectations that bear on the management of risk.
- ✓✓ Material role in managing risk or whose ex ante actions impact on the scope of the outcome.
- ✓✓✓ Complete/significant role in controlling or managing risk or whose ex ante actions impact on the scope of the outcome.

44. There may be changes in the water and sewerage sectors that have an effect on risk allocation. These include:

- a more disaggregated approach to price limits;
- increased contestability at the retail level; and
- upstream water trading.

45. Moving towards a more risk-based approach to monitoring the companies' compliance may also affect risk allocation. We discuss this in more detail in our focus report on regulatory compliance, which we will publish shortly. We welcome any comments on how the effects such changes would have on the risk allocation set out in the table above.

## 7. How could risk be managed?

46. If a risk is allocated to a particular party through a price control, it is up to that party to decide how best to manage that risk. So, if a risk has been allocated to a company and its investors, this will reflect our view that the company is well placed to manage that risk. The company has an incentive to manage that risk in the most efficient way.
47. There are many tools available to the companies to manage risk. They may seek to transfer (some of) the cost associated with a risk to other parties such as insurers, hedging counterparties, the supply chain or parties to whom it has contracted out functions. This may be more effective in cases where the effect of the risk is financial rather than reputational.

### Tools within the current price control that mitigate risk

We use a number of tools within current price controls that have the effect of mitigating risk. They do not reduce the overall level of risk. Instead, they take risk to which companies and investors would otherwise be exposed and allocate a share to customers. In doing this, they weaken incentives on the companies to manage the relevant risk.

Some tools deal principally with the financial consequence for the companies and their investors of different risks, for example:

- indexation;
- interim determinations;
- substantial effect clause;
- logging up or logging down;
- revenue correction mechanisms;
- the length and type of the price control; and
- cost of capital.

A second category of tools deals with the non-cost consequences of risk, for example:

- guaranteed service standards;
- the overall performance assessment (and the service incentive mechanism going forward); and
- shortfalling.

These tools measure different aspects of environmental and service performance. They may all be affected by the consequence of different risks and may be borne by society or, more specifically, customers. Each introduces a financial penalty or reward to incentivise the companies to manage the risk.

Different tools may address a number of risks. For example, the revenue correction mechanism addresses variance in revenues. But it also addresses the risk that the companies may seek to increase demand to the detriment of the environment.

Also, wider policy decisions can influence the allocation of risk. We decide whether the

companies must deliver absolute outcomes (that is, the same outcome for each company), or tailored outcomes that reflect a company's individual circumstances. For example, the companies plan using different assumptions about the frequency with which they will need to restrict water use during times of drought. This reflects the characteristics of their own individual operating environments. Requiring them to plan on the same basis could increase damage to the environment as it could force them to over-abstain water to maintain secure supplies before they can restrict use.

In its [report](#) commissioned by us, Europe Economics set out a more detailed discussion of the regulatory tools currently in use in different frameworks.

48. Disaggregation of the value chain and greater use of market mechanisms would provide additional tools for risk management. For example, in '[Valuing water – how upstream markets could deliver for consumers and the environment](#)' (July 2010), we discussed how water trading would allow one company to manage the risk of supply failures in its area by contracting with another in a different area. In this example, water trading would also encourage the development of a regional or national approach to security of supply. This would have the potential to increase resilience overall.
49. We acknowledge that the companies will not be best placed to manage all risks. Some may be outside of their control, to some extent, and we may wish to mitigate the companies' exposure to those risks. Some of the tools we use currently are outlined above. We will consider risk mitigation in more detail in future focus reports and discussion papers.
50. We also understand the significance of regulatory risk, and our role in ensuring that it is not unduly high. Although we are one player among many in regulating the water and sewerage sectors, the stability, predictability and transparency of our regulatory framework has been a major factor in the relatively low cost of capital that the companies have enjoyed.
51. In the way in which we regulate, and as we think about how regulation should evolve to meet the challenges of the future, our aim is to ensure there is no unnecessary risk premium for uncertainty.

## 8. Next steps

52. We will continue to consider how we will set future price limits until early 2012. At that point, we will publish a framework document setting out our aims for price limits in 2015-16 and beyond, and the tools and principles we propose to use in setting them.

53. We will consult on this framework document towards the end of 2011. Ahead of that consultation, we will publish further focus reports and discussion papers to inform the debate about particular aspects of price limits. As we develop our thinking, we will consult our advisory panel and meet with key stakeholders. The issues that we expect to consider are set out below.

1. Is our definition of risk appropriate?
2. Are the categories of risk we have identified broadly correct?
3. Have we identified correctly the parties that may bear risk in the wider water and sewerage sectors?
4. Is the current allocation of risks that we have set out in this discussion paper broadly accurate?
5. How might risk allocation change as the sectors evolve?
6. How can we best assess which risks customers or wider society should bear?
7. What principles should we use to allocate risk?
8. What information do we need to allocate risk appropriately (in line with these principles)?
9. Are there any additional tools (such as those that other regulators use) we should use in dealing with risk?
10. How can we best use the incentive properties of risk allocation?
11. What insights would behavioural economics bring to our allocation of risk and our use of risk mitigants?
12. How can risk allocation drive better outcomes? Are companies well placed to bear those risks?

54. We will publish a further discussion paper on risk mitigant tools next year. This document will set out our aims in respect of how we intend to use such tools, and the principles we may use in deciding whether and how to use them.

55. We would very much like to receive contributions on these and other issues. If you would like to contribute to the debate, please contact Carolyn Baker, Future Price Limits Interim Project Manager ([carolyn.baker@ofwat.gsi.gov.uk](mailto:carolyn.baker@ofwat.gsi.gov.uk)).

**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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