

## Water trading – scope, benefits and options.

Final Report

4 December 2015

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# Executive Summary

## Background and context

In July 2015, Ofwat published a discussion document 'Towards Water 2020 – meeting the challenges for water and wastewater services in England and Wales'. The discussion document considers the future challenges facing the water sector and outlines how Ofwat can help address these challenges:

- By developing the framework for economic regulation to facilitate and incentivise companies to be innovative and deliver even better outcomes to customers; and
- Through the Water Act 2014, which provides additional opportunities to enhance the way markets are used to deliver services to customers in England, both at a retail and wholesale (upstream) level.

Ofwat's initial proposals on the role of markets and the required changes to the regulatory framework, if any, are expected to be published in December 2015.

## Scope of work

Deloitte LLP has been appointed by Ofwat to undertake an assessment of the scope, benefits and options relating to physical water trading (raw or treated water) in England and Wales. In this report, water trading refers to physical transfers of large volumes of water, but without a change in the underlying abstraction licence. The trading in water abstraction rights is outside the scope of this report. The approach used to undertake the work included:

- Assessing previous and current levels of physical water trading in England and Wales;
- Undertaking desk research and engaging with stakeholders to summarise the costs and benefits of water trading, potential barriers and mitigations, together with any lessons that can be learned from water trading in other countries;
- Distinguishing between the economic fundamentals and barriers to water trading and, combining this with Ofwat's quantitative analysis of water trading, assessing the potential scope for water trading in the future; and
- Developing high-level water market design options and evaluating them against Ofwat's Water 2020 Design Assessment Criteria.

## Scope for water trading and potential barriers

In 2013/14, bulk supply<sup>1</sup> exports represented 4.2% of water companies' distribution input (equivalent to 620Ml/day). Over the last 15 years, this metric has been relatively stable, varying between 4.1% and 4.6%.

A number of factors are likely to influence the level of trading currently observed. The assessment has sought to distinguish between economic fundamentals and non-economic barriers to trading. This distinction is driven primarily by whether regulatory and/or policy drivers can be adjusted to influence the level of water trading – economic fundamentals are those factors that cannot be overcome through regulatory intervention. The economic fundamentals that have an impact on the level of water trading include the following:

- **Transportation cost.** High transportation costs relative to the value of water, in particular over longer distances.<sup>2</sup> This may lead to insufficient volumes of water available to trade within an economically attractive distance;
- **Marginal cost of supply.** High capex and transaction costs relative to the marginal cost of supply differentials between different areas; and
- **Supply and demand.** For trade to occur, there needs to be scarcity of water to drive demand from prospective buyers, as well as a surplus of water elsewhere to facilitate its supply.

However, the stakeholder engagement and research undertaken has also identified a number of barriers to water trading in England and Wales which include the following:

- **Regulatory incentives.** Weak economic incentives to buy and sell water, such as insufficient length of time during which benefits from trading are retained by companies or the use of average costs instead of marginal costs;
- **Policies and institutional factors.** Environmental policies and regulations, such as the Strategic Environment Assessment, Habitats Regulations Assessment or the EU Water Framework Directive, may make it more challenging to enter into a trading arrangement. There is also uncertainty about future abstraction reform, including how it will develop and what impact it will have on the water industry; and
- **Risk perception and information asymmetry.** Companies may be concerned about the impact of trading on their business and in particular on their security of supply obligations, customer perceptions, or water quality. In addition, there may be information asymmetry

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<sup>1</sup> A 'bulk supply' is a supply of treated or untreated water traded between individual appointed water companies. These supplies are often traded under long-term contracts and on non-standard terms. Such supplies are usually large in volume (i.e. bulk) although not always.

<sup>2</sup> New sources of water, for example as a result of abstraction reform, could be identified closer to the current centres of demand. Trading that makes use of such sources could reduce the overall distance over which water is transported, which could benefit the system as a whole.

between market participants (for example, supply costs, volumes of surplus, value of water or scarcity signals), which makes companies reluctant to engage in trading.

- **Market structure.** It is possible that the vertically integrated structure of the industry, based around regional monopoly providers, might act as a barrier to trading insofar as incumbents have the ability and the incentive to act in a potentially anti-competitive way to limit the degree of trading. However, the current level of available evidence is not conclusive in this regard and additional analysis is required to determine whether or not market structure is affecting the level of trading.

The observed levels of water trading are therefore likely to reflect a combination of both economic fundamental and barriers to trading. To the extent that the barriers to the trading can be successfully mitigated, there may be some further scope for water trading in England and Wales. The proposed market design outlined in this report has been developed by considering existing barriers to trading as well as a number of other factors, including a review of costs and benefits of trading and Ofwat 2020 assessment principles.

Ofwat has undertaken an update to its 2010 quantitative analysis of trading in England and Wales. The analysis estimates that there is a net benefit of around £847m (net present value in 2011/12 prices) over the lifetime of the assets from 19 interconnection schemes. Eleven of these schemes have been identified between appointed companies, which provide a potential indication of the scale of water trading. The remaining eight interconnections have been identified within existing companies' boundaries and these correspond to internal water transfers. The majority of the 19 interconnections were found in the South and East of England.

## Market design

A proposed marked design has been developed based on an assessment of the scope, potential benefits and identified barriers to water trading. It has taken into account publicly available information, stakeholder views and feedback from Ofwat.

The proposed market design aims to mitigate the issues and barriers to trading identified above and to prevent companies from exploiting their market power and/or from discriminating against new entrants. It also aims to be practical, by developing proportionate solutions to the problems being addressed, by minimising transaction costs and by supporting the functioning of an efficient market.

## Market design assessment criteria

The proposed market model for water trading consists of a number of key features, as set out below. For each of these, a spectrum of options was considered, ranging from status quo, moderate changes, through to significant regulatory and/or policy intervention. The range of options for each of the potential market design components was evaluated against Ofwat's Water 2020 assessment criteria set out below:

How well the option helps Ofwat achieve their objectives	How well the option addresses known problems	How practical the option is
<ul style="list-style-type: none"> <li>• Strategic and price control principles to enable Ofwat to fulfill its duties</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental, resilience and affordability challenges</li> <li>• Customer expectations</li> </ul>	<ul style="list-style-type: none"> <li>• Resources, timescales and costs required</li> </ul>

## Potential options and selection process

Table 1 sets out the range of options for each component and the rationale for rejecting specific options. The selected option is highlighted in light green bold font, while the rationale for discarded options is presented in red boxes beneath individual options.

A more detailed description of individual options and the rationale for selected preferred options, can be found in Appendix A. The preferred option was selected on the basis of Ofwat's Water 2020 assessment criteria. The design has sought to recommend options that are light-touch, targeted, lower-cost, effective and proportionate to support water trading.

**Table 1: Potential design options**

Level of intervention	←—————→		Low	High
<b>Component</b>				
<b>1 Information database</b>			Companies hold information <b>No level playing field</b>	<b>Central information database created</b>
Level of participation	Voluntary <b>Does not address the problem</b>	<b>Mandatory for licensees only</b>		Mandatory for all market participants <b>Not practical</b>
Type of information	For companies to decide <b>Does not address the problem</b>			<b>Agreed set of standard data</b>
Level of access	Free access to all information <b>Commercial sensitivity</b>	Different depending on type of information <b>Too complicated/limited benefits</b>		<b>Market participants only</b>
Frequency of updating information	As and when changes occur <b>Costly and leads to asymmetry</b>	Every 5 years (in line with WRMP) <b>Not frequent enough</b>		<b>Annually</b>
<b>2 Bid characteristics</b>	No standards defined <b>Does not address the problem</b>	<b>Minimum criteria</b>		Defined template <b>Costly / not flexible</b>
Access Pricing reforms	<b>Proceed ahead of reforms</b>	Implement alongside reforms		Implement after reforms <b>Delays market development</b>
<b>3 Assessing bids received</b>	No additional requirements <b>Does not address the problem</b>	Mandatory, with reputational incentive <b>Insufficient incentive</b>		<b>Mandatory, with rewards/penalties</b>
Frequency	Every five years <b>Not frequent enough</b>	Annual window		<b>Ongoing</b>
Disclosure of bids	None <b>Not frequent enough</b>	Voluntary <b>Mandatory via information database</b>		Mandatory via annual reports <b>Commercial sensitivity</b>

**Table 1: Potential design options (continued)**

Level of intervention	Low	←—————→	High
<b>4 Bid assessment methodology</b>	No defined methodology <span style="border: 1px solid red; padding: 2px;">Does not address the problem</span>	Principles based	Tightly defined methodology <span style="border: 1px solid red; padding: 2px;">Costly / not flexible</span>
Recourse option	No defined process <span style="border: 1px solid red; padding: 2px;">Risk of discrimination</span>	Company specific	Common process via Ofwat
National coordination	Not required at this stage	Include as a principle	Regional coordination Mandated National coordination <span style="border: 1px solid red; padding: 2px;">Centralised control is not pro-market</span>
<b>5 Risk allocation and economic incentives</b>	No additional incentives <span style="border: 1px solid black; padding: 2px;">Further assessment needed</span>	Extend PR14 incentives	Develop new longer term incentives
Security of supply issues	No change <span style="border: 1px solid red; padding: 2px;">Does not address the problem</span>	Contractual requirement <span style="color: green;">Restructure penalties under supply obligation</span>	Develop industry code for supply curtailment <span style="border: 1px solid red; padding: 2px;">Disproportionate / not flexible</span>
Interconnection incentives	No additional interconnection incentives		Develop specific incentives <span style="border: 1px solid red; padding: 2px;">Arbitrary and biased</span>
<b>6 Contract template</b>	No standard template <span style="border: 1px solid red; padding: 2px;">Does not address problem</span>	Voluntary templates only	Standard template clauses or bilateral contracts with certain clause requirements Standard template clauses only <span style="border: 1px solid red; padding: 2px;">Disproportionate / not flexible</span>
<b>7 Market codes</b>	No additional codes <span style="border: 1px solid red; padding: 2px;">Does not address problem</span>	Process for considering bids	Company specific codes Industry wide code <span style="border: 1px solid red; padding: 2px;">Disproportionate / not flexible</span>
<b>8 Value sharing</b>	Existing PR14 incentives <span style="border: 1px solid red; padding: 2px;">Does not address problem</span>	Absolute value return	Cap on return Cap on return, tiered No cap on return <span style="border: 1px solid red; padding: 2px;">Customers do not benefit</span>
<b>9 Market structure - system operator</b>	No change	Functional separation	Structural separation <span style="border: 1px solid red; padding: 2px;">Appears disproportionate</span>

Source: Deloitte analysis

## Proposed market model features

- **Mandatory information database.** A central Mandatory Information Database to be managed by a third party to include information that would aid the identification of water trading opportunities. Wholesalers would be required to submit specific information on an annual basis and in a predetermined format, while other market participants may contribute information to the database on a voluntary basis. Companies would need to provide assurance on the quality and reliability of the data submitted to the central database. Access would be restricted to licensees and potential market participants.
- **Ongoing mandatory bid assessment.** A requirement, supported by a penalty/reward mechanism, on licensees to assess on an ongoing basis 'bids' received from third parties, using a principles-based assessment methodology with minimum quality requirements set out for bids that are submitted. The outcome of the bid assessments would also be included in the database and available to other parties, although the process would need to protect commercially sensitive information. A recourse process for parties that have their bids rejected would be made available through Ofwat. There would not be any national coordination required at this stage.

This component aims to develop an ongoing 'competition for the market', where bidders aim to win a share of a market which retains monopolistic elements. This in turn is expected to encourage more trading to take place and is at the 'lighter' end of potential intervention options.

- **Trading incentives.** The current price control review ("PR14") trading incentives may need to be extended, but further assessment is needed. However, there would need to be a cap on the returns, determined in consultation with stakeholders, to ensure that there is a balance in terms of the environment, customers and companies sharing the benefits from water trading. There would not be any additional incentives developed specifically for interconnection.
- **Voluntary contract templates.** Parties would be free to develop their own contracts, assumed to be on a bilateral basis, but a contract template could also be developed for market participants to use. In particular, specific clauses (for example, on dealing with security of supply issues) which can be used in contracts or as a starting point for negotiations would be available, to reduce new entrants' perceived information asymmetry. While incumbents are expected to have experience in negotiating contracts and trading arrangements, contract templates can be helpful in reducing information asymmetry and transaction costs, particularly for smaller players (either new upstream licensees or new entrants from other sectors, such as agriculture, as a result of abstraction reform).

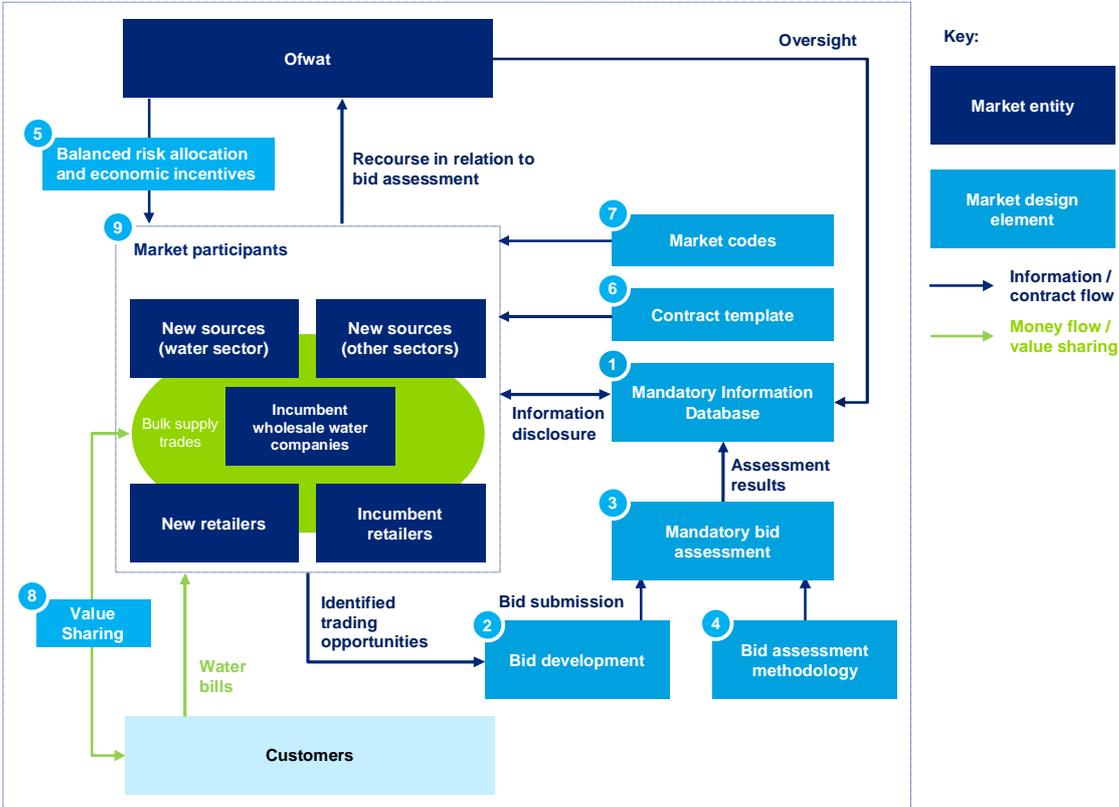
Water trading can be implemented ahead of access pricing reforms being completed. The report also comments on the possibility that mandatory contract templates be used, as an alternative to bilateral negotiation and arrangements.

- **No new market codes.** The working assumption is of a market primarily based on bilateral contracting between parties (including the non-mandatory option of using a contract template), which means that new market codes would not be required beyond what is currently planned for the PR14 water trading incentive mechanism. As the upstream markets continue to develop, this approach may be revisited.

- Security of supply barrier.** A number of changes would need to be implemented to overcome the security of supply barrier to trading. Initially, this could be done through a combination of measures including:
  - Developing clearer and non-discriminatory rules for supply curtailment and/or for sharing non-delivery by a particular water source, particularly where this affects cross-border supply; and
  - Encouraging smarter contracting (e.g. tiered financing) and hedging, for example through the publication of case studies and/or worked examples.
- Status quo market structure.** There is no requirement for changes to the market structure. The industry would continue to rely on existing competition law to ensure there is no discriminatory behaviour by the incumbents.
- Continued geographic averaging of prices.** Under the proposed market design, for bilateral based competition to occur, a mechanism would be needed that would allow new resource providers to recover the marginal cost of the new resource, whilst ensuring that customers continued to receive the average price.

An outline of the proposed market model is shown in Figure 1, showing the nine main components of the proposed market design. The proposed market model has been designed to aid water trading but can also be used to support a bilateral market.

**Figure 1: Proposed market design**



For each of the nine market design components, the spectrum of available options was analysed to identify the preferred one. Table 2 summarises the nine components, the issues being addressed through the proposed designed option and the reasons for selection the specific option.

**Table 2: Market design components, issues being addressed and reasons for option being selected**

Component	Issues being addressed	Reasons for option being selected
<b>1. Information database</b>	Information asymmetry Uncertainty on the marginal value of water	The Mandatory Information Database improves on the status quo, by boosting transparency and predictability in the market. It enables companies to identify potential trading opportunities, which ultimately can help addressing the problems of resilience, affordability and environmental sustainability. The implementation builds on existing tools and data collection processes and imposes limited costs on the industry, provided that the commercial sensitivity of data is adequately protected.
<b>2. Bid characteristics</b>	Information asymmetry Non-marginal pricing	By standardising bid characteristics and by mandating the use of marginal pricing, a high degree of comparability is achieved across companies. This supports market efficiency and is proportionate to the challenge of information asymmetry.
<b>3. Assessing bids received</b>	Potential discrimination and market power	A mechanism for encouraging companies to assess the bids on an 'as received' basis is a proportionate and targeted. This is an appropriate approach on the basis that the number of bids received by each company in a given year is expected to be limited, therefore the costs are not disproportionate.
<b>4. Bid assessment methodology</b>	Potential discrimination and market power	A principles-based assessment methodology strikes a balance between an arbitrary bid assessment and a complex rules-based methodology, which would not provide sufficient flexibility. By disclosing the outcome of the assessment, companies have a reputational incentive to identify efficient outcomes and to prevent discrimination.
<b>5. Risk allocation and economic incentives</b>	Policy and environmental barriers Security of supply, control and reliability	By strengthening the economic incentives to trading, a balance is reached between the status quo (which appears to have led to limited trading to date) and excessive returns to companies. Economic incentives are developed in a way that is commensurate with the additional security of supply risks that trading creates for companies (notwithstanding changes to the contractual approach).
<b>6. Contract template</b>	Security of supply, control and reliability Water quality Potential discrimination and market power	Voluntary contract templates are preferred to mandatory ones, since the latter would most likely not suit all companies and could act as a barrier to trading (besides being costly and time-consuming to develop and agree at an industry level). Availability of contract templates has the potential to reduce transaction costs for market participants and provide a level playing field from the perspective of new entrants.

Component	Issues being addressed	Reasons for option being selected
<b>7. Market codes</b>	<p>Security of supply, control and reliability</p> <p>Water quality</p> <p>Potential discrimination and market power</p>	<p>The experience from retail water markets and other sectors indicates that the development of new market codes is a complex and costly exercise.</p> <p>By building on the existing PR14 approach, and relying on contractual solutions to trading challenges, such costs of developing market codes are avoided. This seems proportionate to the scale of the opportunity.</p>
<b>8. Value sharing</b>	Weak incentives to trade	<p>The value-sharing mechanism aims to strike a balance between the status quo (limited incentives for companies to trade), and an uncapped return on investment, which could result in excessive returns to some companies, and limited sharing of the benefits from trading with customers.</p> <p>An intermediate approach, with a higher, but capped, return appears to be the most appropriate in balancing the economic incentives and addressing the challenge of affordability.</p>
<b>9. Market structure</b>	Potential discrimination and market power	<p>Changes to market structure would be a costly, complex and disproportionate solution to the challenges of water trading.</p> <p>Unbundling of upstream water licences appears to be a sufficient initial step in developing water market in England and Wales.</p>

# 1 Introduction

The Water Services Regulation Authority (“Ofwat”) is the water regulator for England and Wales, responsible for the delivery of good quality water services to consumers.

Ofwat regulates the water sector through five-year price control reviews, and is currently engaging with stakeholders on the future regulatory framework, including the next price control (“PR19”). As part of this process, Ofwat is looking at the extent to which upstream water trading among existing companies and/or with new entrants could create additional value for customers.

The PR14 final methodology published in 2013 included the intent by Ofwat to *“improve the way companies use resources in the short term”* (PR methodology 2013, pp. 24). In particular, Ofwat has sought to encourage water trading among existing and new companies and to encourage more responsible abstraction through the Abstraction Incentive Mechanism (“AIM”).

Historically, water trading among incumbent water companies has been limited relative to total volumes of water supplied to customers. In Price Review 2014 (“PR14”) and through the Water Act 2014, Ofwat has started to develop a framework that encourages trading to take place, with measures including a move to a total expenditure (“totex”) approach to cost assessment and specific import and export incentives for water companies. The opportunity to develop and make use of markets to deliver services to customers in England, both at a retail and wholesale level, is one of the key elements introduced by the Water Act 2014.

Further policy developments have also taken place in the water sector. In particular, Defra has been actively developing abstraction reform. Work has also begun on the guidance for companies to develop their long-term Water Resource Management Plans (“WRMPs”) ahead of the next WRMP development process.

Building on these initial measures and the July 2015 discussion document ‘Towards Water 2020’, Ofwat will publish and consult on its initial proposals for regulatory changes for the PR19 price control review in December 2015. This consultation may include further options for promoting upstream trading in the water sector and a high-level design of a water market.

Ofwat has commissioned Deloitte LLP (“Deloitte”) to prepare a report covering the scope for water trading in England and Wales, barriers to water trading and market design options for water trading, which would be evaluated against Ofwat Water 2020 assessment criteria.

## 1.1 Scope of work

The main objective of the work is to assess the extent of current and future scope for raw and treated water trading, its benefits and barriers, as well as high-level market design options.<sup>3</sup> The scope of work covered in this report is as follows:

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<sup>3</sup> It was beyond the scope of this work to consider the potential for abstraction rights trading, although the report does take into account the proposed water abstraction reforms.

- **Potential for water trading.** Review existing information on water trading levels in England and Wales, and assess the scope for water trading in the medium and long term.
- **International experience.** Provide case studies on water trading arrangements in other geographies, including Australia.
- **Benefits.** Use existing information from Ofwat analysis, published research and stakeholder engagement to summarise the costs and benefits of water trading.
- **Barriers.** Summarise existing information from public documents, Ofwat reports and stakeholder engagement to evaluate barriers to water trading in England and Wales, and assess options for their mitigation.
- **Market design options.** Set out high-level water market design options, and evaluate them against Ofwat's Water 2020 assessment criteria.

As part of the project a number of stakeholders have been engaged, including incumbent water companies, potential new entrants and water sector regulators. This engagement has been used to collect views and comments regarding issues relevant to water trading covered in this report. The scope of this report does not include validation of the existing research, data analysis or modelling carried out by Ofwat and/or third parties.

## 1.2 Outline of the report

The remainder of this report is structured as follows:

- Section 2 summarises current levels of water trading in England and Wales and describes the scope for water trading in the medium and longer term (including Australia and South East England case studies);
- Section 3 outlines the costs and benefits of increased water trading;
- Section 4 assesses the main barriers to trading, and sets out potential mitigations options; and
- Section 5 outlines potential market design options for water trading and assesses a proposed option against Water 2020 assessment criteria.

## 2 Scope for water trading

This section sets out the existing levels of trading in England and Wales and assesses the potential scope for water trading in the medium and long term.

While it is possible to observe the current levels of water trading from historical data, it is not clear whether this level reflects an ‘optimal’ level of trading, or whether the level is ‘too low’. This will depend on the extent to which the trading levels reflect underlying economic fundamentals, or whether the trading is limited by other barriers. In the past, companies have typically invested in intra-company, rather than inter-company, water transfer opportunities. This preference for ‘internal trading’ of water suggests that companies may have been influenced by barriers to trading, rather than just economic fundamentals.

The scope for water trading is identified in this report as the difference between the current level of water trading and the level of water trading that would prevail if there were no barriers to trading and that would only reflect the underlying economic fundamentals.

If barriers to trading exist, it may be appropriate for a regulatory intervention to attempt to mitigate them. If on the other hand the current levels of water trading were reflective of the underlying economic fundamentals, then such an intervention may not be required. However, some of the barriers may have already been addressed as part of the PR14, although the impact of the regulatory changes may not yet be fully seen.

This remainder of this section is structured as follows:

- Section 2.1 sets out the background context on the water industry structure.
- Section 2.2 presents an overview of the economic fundamentals and barriers to trading and clarifies the distinction between the two terms.
- Section 2.3 presents a summary of the current levels of water trading in England and Wales.
- Section 2.4 presents an analysis of economic fundamentals and barriers as drivers of the current levels of trading.
- Section 2.5 concludes on the scope for additional water trading in England and Wales.

### 2.1 Water industry structure

The water and wastewater industry provides services across a number of functions along the value chain, including upstream functions such as abstraction, distribution and water treatment, as well as retail functions.

The present structure of the water industry derives from the Water Act 1973, which transferred the duties of providing water and wastewater services from local authorities to ten publicly-owned water authorities. Today, there are ten water and sewerage companies (WASCs) and nine water only companies (WOCs) in England and Wales. All are vertically integrated and privately held or

listed (though Dŵr Cymru is the only not-for-profit organisation). All companies operate within the boundaries that were fixed at privatisation as regional monopolies.

Since privatisation, the water and sewerage sector in England and Wales has been subject to limited competition given natural monopoly characteristics of the regional water and sewerage networks. However, the Water Act 2014 will open up the non-domestic water markets to retail competition in 2017 and will give the vertically integrated monopolies the option to exit the non-domestic retail market, subject to permission from the Secretary of State.

The Water Act 2014 also made provisions for upstream competition and abstraction reform in companies operating wholly or mainly in England. The Welsh Government has taken the decision not to implement all of the upstream reforms for incumbent water and sewerage companies that operate in an area wholly or mainly in Wales, at this point in time.

With these proposed market reforms, there is a question as to whether the benefits of vertical integration outweigh the potential costs in a sector where markets are expected to play a greater role. The costs and benefits of vertical integration in a network industry are well documented in economic literature and are summarised below.

The fundamental trade-off is between the economies of scale and scope that vertical integration creates, relative to the potential anti-competitive impacts.

### **Benefits of vertical integration**

**Economies of scale and scope.** Vertically integrated companies may have lower average costs of providing services if they deliver a larger volume of services (economies of scale) and/or if they span a larger number of activities across the supply chain (economies of scope). The cost reductions are fundamentally driven by a reduction in fixed/overhead costs relative to the volume of service provided and by a reduction in transaction costs.

**Coordination.** Vertically integrated companies may also be able to better coordinate their internal activities. For example, by managing security of supply risks and internalising contractual arrangements and by sharing those risks between wholesale and retail activities, companies may be able to reduce the overall riskiness of the business, which can help reduce their cost of financing.

### **Costs of vertical integration**

**Risk of anti-competitive behaviour.** In theory, vertically integrated firms might act in an anti-competitive manner. In particular, they could do so by engaging in price (or non-price) discrimination to disadvantage potential new entrants and, potentially, foreclose elements of the market. For firms to be able to do this: (i) the vertically integrated firm would need to possess market power in one market; and (ii) would need to have both the ability and incentive to leverage that market power into a related market. Crucially, the strength of the incentive depends on the size of the gains from the anti-competitive behaviour compared to the costs in terms of the forgone efficiency savings associated with, in this case, making greater use of third party resource.

Such risks might be mitigated by competition law, but may also need to be further supplemented by the regulatory framework, for example by providing forms of recourse against such behaviour and / or revealing information in a way that reduces the likelihood of such behaviour going undetected. The balance in terms of when regulatory intervention is appropriate depends on both the likelihood and adverse consequences of the potential anti-competitive behaviour. In situations where the behaviour is considered to occur more frequently and where its consequences are most pronounced, competition law may not be a sufficient tool.

**Risk of inefficiency.** Vertically integrated companies may find themselves facing limited competition, compared to an unbundled and competitive market, so they may have weaker incentives to implement efficiency measures. Again, this is normally mitigated through the design of the regulatory framework.

Overall, the preference for vertical integration in the water and wastewater industry depends on the potential scale of costs of vertical separation relative to the benefits. This in turn is driven by considerations of the cost structure of the industry, the need for internal coordination, the barriers to competition that vertical integration may create and the ability and strength of the regulatory framework to incentivise companies to use their assets efficiently.

The challenges of vertical integration have been documented in Pollitt and Steer (2011). This report, commissioned by Ofwat, considered the vertical integration of the UK water and wastewater sector in more detail, focusing in particular on economies of scale and scope. It found that the evidence on benefits from unbundling water industry is mixed and that additional research is required.

On balance, the evidence on the impact of vertical integration in the water industry on the market outcomes seems inconclusive. Vertical integration has therefore not been identified as a major barrier to water trading (see Section 4), although this finding may change in the future if and when additional research is carried out. When developing the proposed water market design, the main focus remained on addressing those barriers that have been identified, and has not suggested that changes to the vertically integrated structure of the industry are necessary at this stage. Nevertheless, it may be appropriate for the Government to review this conclusion in the future if new evidence becomes available that would suggest that vertical integration in the water industry is in fact a significant barrier to trading.

## 2.2 Economic fundamentals and barriers to trading

This report distinguishes between economic fundamentals and non-economic barriers to trading, although sometimes the observed levels of water trading may reflect a combination of both.<sup>4</sup>

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<sup>4</sup> For example, there may be environmental challenges arising from specific interconnections between companies, such as a requirement to protect certain habitats. Such challenges could be interpreted as barriers to trade, in the sense that existing regulations impose additional requirements on the water companies and thus form a barrier. However, if such challenges can be overcome at an additional cost, then they become part of the overall economic assessment of the trading opportunity and can be seen as a fundamental economic (cost-benefit) factor.

The distinction is driven primarily by whether regulatory and/or policy drivers can be adjusted to influence the level of water trading – economic fundamentals are those factors that cannot be overcome through regulatory intervention. These are summarised in Table 3 and Table 4.

**Table 3: Economic fundamentals: overview**

Category	Economic fundamentals
<b>Costs</b>	High transportation costs relative to the value of water as a commodity, which limits the distance over which profitable trading opportunities can be identified
	High capex and transaction costs relative to the marginal cost of supply differentials between different areas
<b>Relative scarcity</b>	Relative scarcity of water between regions is required to drive demand from prospective buyers, as well as a surplus of water elsewhere to facilitate its supply.

**Table 4: Barriers to trading: overview**

Category	Barriers to trading
<b>Regulatory incentives</b>	<p>Weak economic incentives to buy and sell water may include:</p> <ul style="list-style-type: none"> <li>• A capex bias (a preference for capex solutions relative to opex solutions driven by the structure of the regulatory regime);</li> <li>• Insufficient incentives for export and imports, including an insufficient length of time during which benefits from trading are retained by companies; and</li> <li>• Inappropriate pricing, such as using average instead of marginal costs.</li> </ul>
<b>Policies and institutional factors<sup>5</sup></b>	<p>Environmental policies and regulations may make it more challenging to enter into a trading arrangement.</p> <p>Examples include the Strategic Environment Assessment, Habitats Regulations Assessment and EU Water Framework Directive. Uncertainty around abstraction reform can also be a factor that makes companies reluctant to trade water.</p>
<b>Risk perceptions and information asymmetry</b>	<p>Information asymmetry among market participants may include:</p> <ul style="list-style-type: none"> <li>• Inadequate data on supply costs and surplus / deficit volumes in specific areas;</li> <li>• Inadequate data on true value of water / scarcity signals, to help identify economically attractive opportunities for water trading; or</li> <li>• Inadequate data on water quality.</li> </ul> <p>In addition, companies may also be concerned about the impact of trading on their own security of supply obligations.</p> <p>Finally, other risks perceived by companies include customer acceptability: a deterioration (actual or perceived) in water quality as a result of mixing different sources may be a barrier to trading, as companies may not wish to adversely impact their customers.</p>

<sup>5</sup> Vertical integration of incumbent companies could also in principle be a barrier to trading. However, stakeholder engagement has not identified this as a major factor and the unbundling of upstream licences is expected to largely mitigate such a potential barrier.

## 2.3 Water trading in England and Wales

This section provides an overview of the recent levels of water trading in England and Wales, including raw and treated water. In this report, trades refer to physical transfers of large volumes of water, but without a change in the underlying abstraction licence.<sup>6</sup>

Section 2.3.1 summarises the historical water trading volumes, and Section 2.3.2 presents the potential role for water trading in the future.

### 2.3.1 Historical water trading levels in England and Wales

Historically, trading between water companies has been relatively low and this has not evolved materially since the privatisation of the sector in 1989. Figure 3 shows that the level of water traded as a percentage of distribution input has been relatively stable over the last 15 years, varying between 4.1% and 4.6%.

The volume of water exported by incumbent companies has also been relatively low, with circa 230,000 Ml/year in 2013-14. As shown in Figure 2, based on data from Ofwat's Bulk Supply Register, the majority of water companies exported less than 20,000 Ml/year, accounting for less than 5% of their total supply, as has been the case since 1997 (see Figure 3).

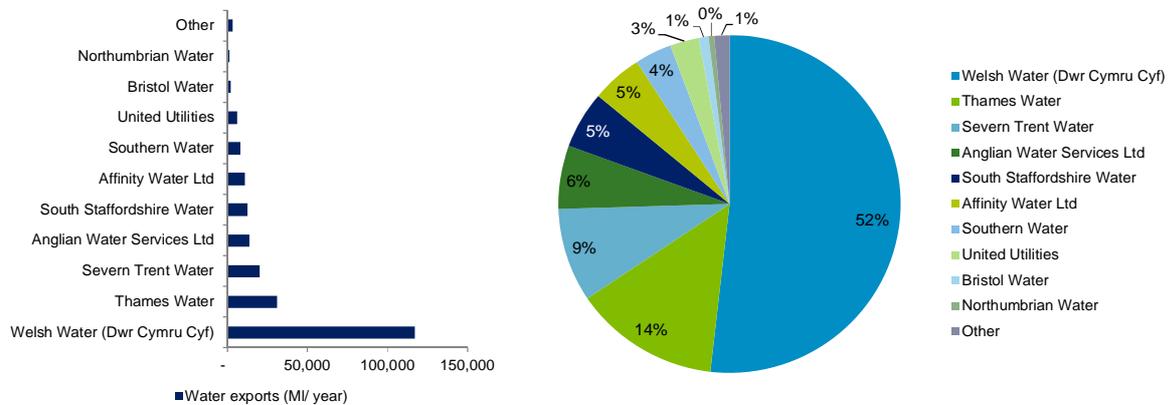
The exception to this is Dŵr Cymru, with over 120,000 Ml per year of bulk supply exports, which corresponds to 52% of its total supply (Dŵr Cymru 2013, pp. 76). The vast majority of this volume (around 95%) was exported to the adjacent Severn Trent Water company, mostly through a single interconnection from the Elan Valley Reservoirs system (owned by Dŵr Cymru) to Birmingham (Ofwat Bulk Supply Register, Severn Trent WRMP09).

This data is influenced by the ownership of the water resource assets. For example, Dŵr Cymru's Elan Valley transfer to Severn Trent Water is counted as a water trade in the Bulk Supply Register because it is between Dŵr Cymru and Severn Trent Water. In contrast the Lake Vyrnwy transfer from Wales to Manchester is owned in part by United Utilities and so does not feature as a water trade in the data. This indicates that companies move larger volumes of water between appointed areas when such transfers are internal to the company, compared to the volume of water that they trade at an arm's length.

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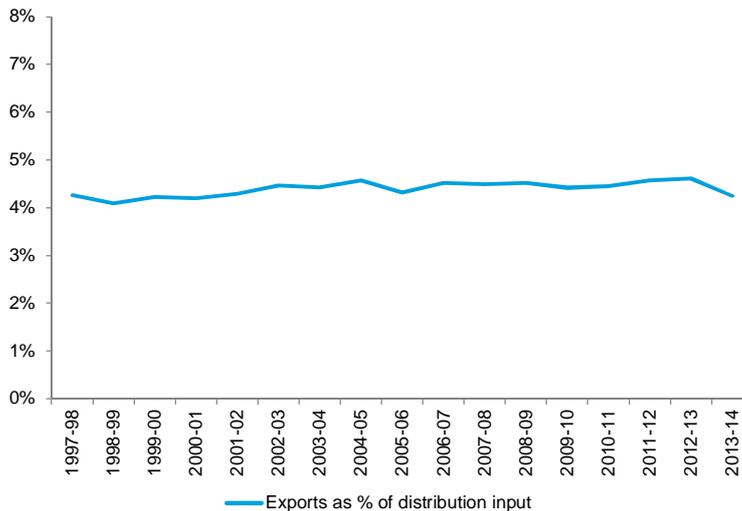
<sup>6</sup> Water rights trading, in particular abstraction rights trading, may be complementary to physical water trading in terms of market design. However, since it falls under Defra's reform programme, it is not within the scope of this report to assess the potential for water rights trading.

**Figure 2: Volume of water traded and percentage share against total water traded by company in England and Wales, 2013-14**



Source: Ofwat Bulk Supply Register

**Figure 3 Bulk supply exports as percentage of distribution input**



Source: Ofwat Bulk Supply Register

### 2.3.2 Water trading in the future

Ofwat (Water 2020 - promoting markets, pp. 13) estimates that there is significant potential to increase the volume of water trading from its current level. It has suggested that water trading and the development of upstream markets can help the water sector address its long-term challenges and sustainability issues. In particular, this relates to:

- Environmental challenges.** There are a number of areas in England and Wales where licenses have been issued that would enable their owners to extract water in an unsustainable way – known as ‘over-licensed’ areas. Furthermore, there are areas where water is being abstracted at a rate that is not environmentally sustainable (‘over-abstracted’ areas). However, there are also areas where spare water is available in England and Wales (see Figure 7 in Section 2.4.1).

Water trading could allow for the re-balancing of supply and demand by enabling trades to take place between areas with greater water availability and those where water is scarcer. This could relieve the pressure on over-abstracted areas and help mitigate some of the environmental challenges that the water industry is currently facing.

- **Supply and demand balance.** Population growth, particularly in the South East of England, together with the effects of climate change on weather patterns, is likely to make it more difficult for individual water companies to balance supply and demand within their appointed areas. This may be particularly acute in areas where the resource pressures are expected to be the most severe.

By trading water with their neighbouring companies, water companies can better balance their supply and demand by considering a wider range of water resources, including those outside their appointed area. This would improve the efficiency of water resource allocation which could benefit customers and boost the overall resilience of the sector (further discussion on the efficiency benefits of trading is included in Section 3.1.1).

- **Affordability of water bills.** The National Audit Office (“NAO”) has noted that *“affordability is becoming a real issue for some customers”* and has estimated that 12% of households spent at least 5% of their income on water and wastewater bills (NAO 2013, pp. 18). End user water bills are therefore an important area for policy design.

Water trading has the potential to make water bills more affordable if it can reduce the overall cost of water supply by identifying cost-efficient trades among market participants, and if these savings are then passed on to customers.

There is currently considerable uncertainty around potential future water trading volumes. These will depend on a number of factors, including the impact of any abstraction reforms, regulatory changes implemented during PR19 and beyond (both in the upstream and downstream segments of the supply chain), as well as changes to the market fundamentals such as demand growth and geographical distribution of supply.

- The Environment Agency (“EA”) has found that a significant degree of supply/demand imbalances between water resource zones (“WRZ”) has been observed in the past, and that most companies forecast water deficits over the long term (SVT & EY 2011, pp. 13).
- The EA and Natural Resources Wales have indicated that a significant share of water bodies in England and Wales (25% in England and 7% in Wales) are able to provide a reliable water source for new consumptive abstraction for less than 30% of the time (EA & NRW 2013, pp. 7).

Both of these issues may prompt companies to assess multiple options for new sources of water supply, both within their appointed area and beyond their existing boundaries, which may include trading opportunities.

The Water Act 2014 added an additional primary duty to Ofwat to strengthen the system resilience objective. This has been defined as: *“the ability to cope with, and recover from, disruption, trends and variability, in order to maintain services for people and protect the natural environment, now and in the future”* (Water 2020 - meeting challenges, pp. 18). This additional duty means that Ofwat

has to consider long-term resilience of the water industry when carrying out its role. The need to manage water resources in a sustainable way that supports resilience will continue to be a major driver of potential trading in the future.

Finally, most respondents to the stakeholder engagement have indicated that there could be a greater potential for water trading, compared to current levels. However, they tended to note that the total scale of the potential would depend on a complex interaction of many factors (including regulatory design and abstraction trading reforms).

## 2.4 Drivers of water trading

This section aims to develop a better understanding of the reasons for the existing levels of water trading currently observed, as described in Section 2.1. The objective of this analysis is to identify whether or not the current trading volumes are restricted by barriers to trading, as opposed to economic fundamentals, and could therefore be seen as ‘too low’.

A number of stakeholders have noted that water trading is only one of a number of options to achieve a desired objective, such as greater system resilience or efficiency.

From an economic perspective, the purpose of trading is to identify attractive opportunities for investment in new assets and to generate value from finding lower-cost supply options. This can include both investment in new capacity, as well as trading to enhance the overall system’s resilience to stress events.

A number of water companies identified reasons for not being able to engage in more trading through their WRMPs, including due to economic fundamentals and/or well-articulated barriers, such as regulation. However, since the underlying data used to carry out these assessments is not publicly available, it is not possible to confirm whether additional factors may have also been involved. For example, it might be the case that cultural and/or structural industry factors such as vertical integration of companies have played a role in the decision-making process. Companies themselves may not have been consciously aware of such influences on their decision-making process. Additionally, there may be a problem of coordination across the industry – particularly in terms of identifying complex trading opportunities involving more than two parties.

In light of this, the design of the market model needs to take into account the possibility that other factors, not articulated by companies, may have also been involved.

### 2.4.1 Economic fundamentals

#### Transportation costs relative to the value of water as a commodity

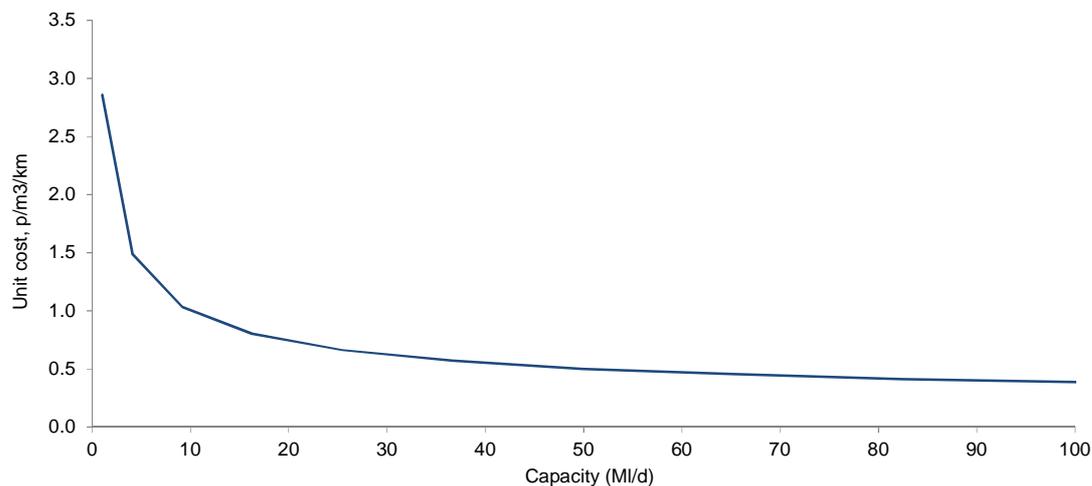
Based on a literature review and stakeholder engagement, there appears to be a general consensus that the costs associated with transporting physical water are significant relative to the value of water as a commodity and constitute “*a substantial proportion of the value of the end product*” (SVT & EY 2011, pp. 19). This is a key fundamental economic factor that limits the number of potential trades that can be economically attractive.

In assessing the potential benefits of upstream water trading, Ofwat estimated the cost per unit length of the interconnection pipes as a function of their capacity, in megalitres of water per day. Ofwat drew on several sources of information, including existing internal analysis and the actual costs of interconnections completed by water companies. Based on this information, Ofwat’s estimated pipeline unit costs are shown in Figure 4.

Average costs are likely to be an appropriate measure of transport costs for the majority of distances involved, as they indicate the potential scale of impact on water bills of individual investment projects. However, the estimates of the pipeline costs may be less accurate where very short or very long distances are involved, since there is less data available to construct these

estimates. Similarly, the estimates of the pipeline costs are expected to depend on the topological and geographical characteristics of the area where specific pipelines are being built, although the materiality of this variability has not been assessed in this report.

**Figure 4: Estimates of pipeline unit costs**

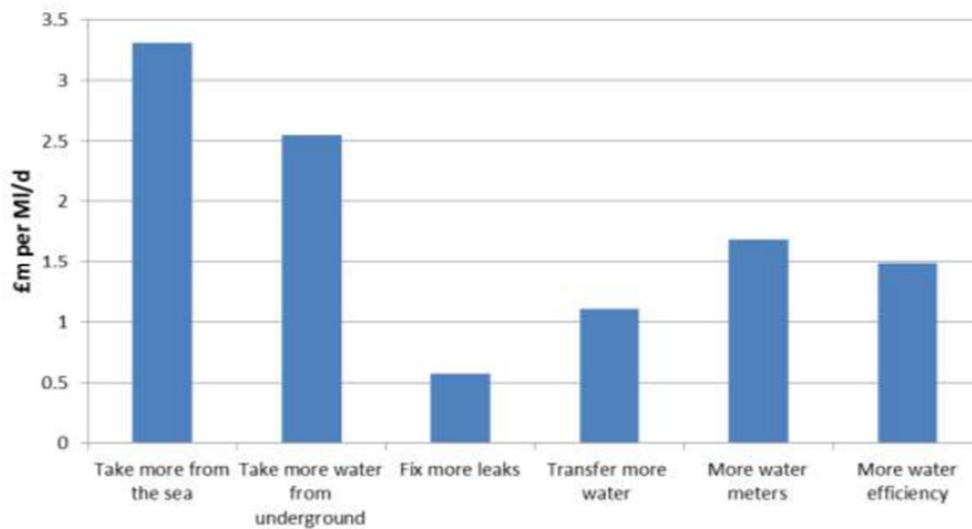


Source: Ofwat 2015

Severn Trent Water found that water transportation costs represent a substantial portion of the total costs of supplying water (SVT & EY 2011, pp. 19).

A number of companies, including Affinity Water, United Utilities, Severn Trent, Thames Water and Yorkshire Water have highlighted the role of water trading opex as a key factor impacting the assessment of potential trading. In particular, United Utilities deemed a number of options to be infeasible due to the long distances involved and the associated operating costs.

However, there may be cases where companies were able to identify economically attractive opportunities. Affinity Water, in the WRMP14, estimated the approximate average capital investment costs per MI per day of water, developed by a set of feasible alternative options under consideration (see Figure 5). Affinity Water found that increasing the volume of water transferred was the second most economical option, with only measures to reduce leakage being cheaper.

**Figure 5: Approximate capital investment cost to build different options types**

Source: Affinity Water WRMP 2014

### High capex costs relative to the supply costs differentials

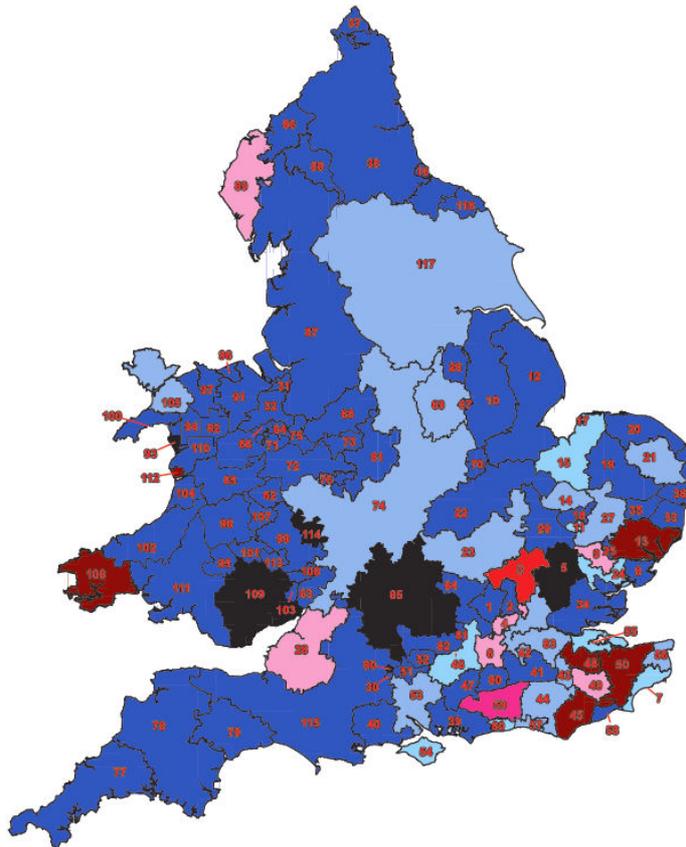
For two parties to have an incentive to engage in water trading, the relative costs and benefits of doing so must be beneficial to both of them.

The metric used by water companies in developing their Water Resource Management Plans (“WRMPs”) is the Average Incremental Social cost (“AISC”)<sup>7</sup> of developing new water resources. These costs vary considerably across England and Wales. In some regions, there is surplus water (so the AISC is zero or negative), while in other regions, particularly in the South East of England, the costs can reach over £1/m<sup>3</sup>. There may be additional challenges to developing new water sources which have not been monetised, including those related to obtaining planning consent.

The map in Figure 6 shows the cost of developing the next water resource in each WRZ in England and Wales. This corresponds to the first major supply-side option water companies proposed to build in their 2014 WRMPs (supply side options include production, resources and any links beyond the WRZ). Where a company’s current schemes are sufficient to meet projected demand in 2039/40, the WRZ is shown in dark blue colour (‘Surplus’). These areas do not necessarily have abundant sources of water such that they could sell spare water to neighbouring areas; rather, these are areas that do not need themselves to develop new sources in the medium term to serve their own demand.

<sup>7</sup> This measure includes the economic, social and environmental costs, to the extent that these can be monetised.

**Figure 6: Incremental AISC of developing water resources to achieve supply-demand balance in 2039-40**



Source: Ofwat 2015

Depending on the costs<sup>8</sup> involved in transferring water, a mutually beneficial trade could exist if the AISC difference between two regions was larger than the full cost per m<sup>3</sup> of transported water.

To illustrate this, if at a regional boundary the difference in the AISC in two neighbouring areas is 40 pence/m<sup>3</sup>, there may be opportunities to trade. On the basis of the cost differentials alone, if the cost of transferring water between the two regions did not exceed 40 pence/m<sup>3</sup>, then this would constitute a potentially economically attractive trading opportunity.

<sup>8</sup> These costs could simply involve operating costs (primarily for water pumping), or could also include capital expenditure if new and/or upgraded infrastructure was required to allow for water transfers.

The geographic variation in AISC suggests that there may be a number of locations where such cost differentials could potentially justify water transfers. Where such locations occur at boundaries between water companies (rather than within a single company's appointed area), this would indicate the potential volume of additional trades that could be cost effective. Ofwat has undertaken analysis and modelling specifically designed to identify these opportunities and calculate the potential benefits from inter-company and intra-company interconnections. The key findings of the Ofwat analysis suggests that there appears to be a significant number of potential interconnection opportunities, including within and between companies, and these could lead to overall net benefits of up to c. £1bn, in 2012/13 prices, over the lifetime of the assets (see Section 3.2 for further details). The actual potential for water trading can differ from Ofwat's estimates. For example, if over time the costs of developing new water resources increased relative to the cost of building new interconnections (as compared to the costs assumed in Ofwat modelling), then the scope for trading could increase.

The supply cost differentials between zones can justify the upfront capex investment, but the balance depends on the engineering feasibility and capex required to improve interconnection among WRZs, including construction costs, feasibility studies and costs of mitigating environmental impacts.

Affinity Water (Affinity WRMP 2014, pp. 144) has deemed the options to trade with Sutton and East Surrey Water infeasible owing to the high capital costs associated with the required infrastructure investment. However, the company has not indicated whether the decision not to trade water was due to the high capital costs relative to the supply cost differentials (which would be an economic fundamental), or whether it was the rate of return on the capital investment that was insufficient, or a combination of the two. Additional information would be required in order to disentangle the reasons for the absence of water trading in this particular case.

### Water scarcity

Water scarcity is a key pre-requisite for the operation of water markets. For trading to occur there needs to be scarcity of water to drive demand from prospective buyers, as well as a surplus of water elsewhere to facilitate its supply. In addition, there is an upper limit on the distances between the demand centres and supply sources that can provide opportunities for trading (as discussed above).

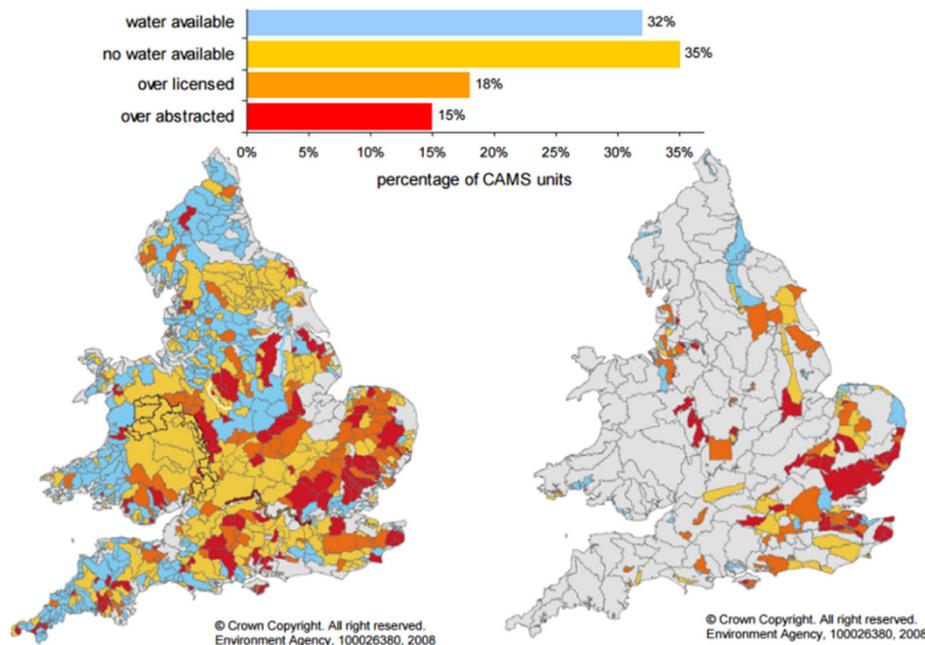
Lack of interconnection, in the short-term (before required infrastructure can be built), is a supply factor that limits the physical volume of water that can be transferred.<sup>9</sup> This may be either a restriction of the volume of water that can be pumped through the existing infrastructure, a limit on the volume of water that can be processed in existing treatment plants, or a limit on the transferability of water in situations where new infrastructure would need to be built.

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<sup>9</sup> In the medium to long term, a lack of infrastructure may indicate that companies had not previously found the opportunity to invest in such infrastructure to be economically attractive. This could be the case if engineering feasibility studies did not identify any investment opportunities that would provide positive net benefits. This is assessed further below, as part of the barriers to trading.

The availability of raw and treated water varies across England and Wales, reflecting rain patterns, abstraction rates and other geographical factors specific to each catchment area. In 2008, the EA assessed the water resources that are reliably available for abstraction through their 119 Catchment Abstraction Management Strategies (“CAMS”) units. The EA found that around one third of the CAMS units had available water, 35% had no water available, and one third faced over-licensing or over-abstraction (see Figure 7) (EA 2008, pp. 6).

**Figure 7: Water availability in England and Wales (2008) – surface water combined with groundwater (left); groundwater (right)**



Source: Environment Agency (2008)

Legend:

- *Water available: water is likely to be available at all flows, including low flows.*
- *No water available: No water is available for further licensing at low flows. Water may be available at higher flows with appropriate restrictions, or through licence trading.*
- *Over-licensed: Current actual abstraction is such that no water is available at low flows. If existing licences were used to their full allocation, they could cause unacceptable environmental damage at low flows. Water may be available at high flows, with appropriate restrictions, or through licence trading.*
- *Over-abstracted: Existing abstraction is causing unacceptable damage to the environment at low flows. Water may still be available at high flows, with appropriate restrictions, or through licence trading.*

The South East of England has been identified as the region with the highest risk of water scarcity. As shown in Figure 7, over-abstraction and over-licensing issues occur in a number of regions across the Midlands, East and South of England. Water is typically only available in the North, West of Wales and the South West.

The relatively low interconnectivity between companies' networks may also reflect the fact that companies have been operating as regional monopolies within their appointed areas. As a result, they may have focused on developing solutions within their own network (within as well as beyond their appointed areas) but they have not always considered connectivity opportunities beyond their own infrastructure. This can be interpreted as a 'cultural' issue, insofar as water companies may

have been implicitly encouraged to focus on ‘within-area’ interconnectivity. It is important to note that this point is distinct from concerns relating to potential discriminatory behaviour.

There may also be limitations to trading within individual companies as well. For example, Dŵr Cymru operates across 24 separate WRZs, which creates challenges in terms of transferring water within existing companies’ boundaries. This, however, is related to the geographical characteristics of Wales and may not necessarily be relevant for all water companies.

Affinity Water (Affinity WRMP 2014, pp. 141) has indicated in its WRMP that it has concerns regarding insufficient tradeable water in neighbouring WRZs. For example, the company was not able to progress some trading options with Anglian Water as the latter was unable to replace the water that would have been transferred to Affinity Water. The company also found that, although there were other parties, for example Essex & Suffolk Water, who had surplus water to trade, these parties were already trading with Thames Water, and hence no water was available for trading with Affinity Water. This example suggests that there may be genuine barriers to trading for some companies. This could be further confirmed if additional information were made available, in particular on the long-run marginal cost (“LRMC”) of the options being assessed (see Section 5 on market design).

The volume of water that can be traded is also limited by reductions in the maximum volume of abstraction, particularly where these occur in zones with over-abstracted water. Regulatory reforms that aim to improve the environmental outcomes, by addressing legacy over-abstraction issues, therefore have three impacts:

- The reforms tend to limit the extent to which further water trading can take place, by reducing the overall volume of water available.
- The uncertainty over the future shape and impact of the reforms limits the extent to which companies may currently be willing to engage in trading. Instead, they may prefer to wait until they have more certainty about their long-term supply options.
- However, such changes also tend to provide a sharper price signal on the relative value of water in over-abstracted areas. These could therefore lead to additional trading in the future, as the relative scarcity value of water in different regions becomes more acutely differentiated.

## 2.4.2 Non-economic barriers to trading

### Weak incentives to buy and sell water

Historically, companies have looked to develop and invest in infrastructure within their appointed area (rather than exploring options from neighbouring companies) to meet growing demand from customers. The main drivers for this have been:

- The regulatory regime tended to reward capital expenditure through the rate of return on companies’ Regulatory Capital Value (“RCV”); and
- Water trading increased companies’ operating expenditure, which tended to penalise companies through Ofwat’s econometric assessment of their operating cost efficiency.

The move to a total expenditure (“totex”) assessment in PR14 has contributed to removing what is known as the ‘capex bias’. Part of the incentive provided by the move to a totex cost assessment is that companies can choose the level and type of expenditure which minimises overall costs without being penalised in Ofwat’s cost assessment. Over time, this is expected to make companies more willing to consider opex solutions (including water trading) to deal with the changes they face, such as potential water shortages.

A number of measures have been introduced in the current price control review period (“PR14”) and through the Water Act 2014 to strengthen companies’ incentives for importing and exporting water. Water companies can retain a higher proportion of the benefits from trading, if they either export and import water (PR methodology 2013, pp. 115).

- For newly qualifying exports in 2015-20, exporters are able to retain 50% of the lifetime economic profits, on top of the normal rate of return.
- For newly qualifying imports during 2015-20, importers are able to keep 5% of their costs. There are further incentives for importers if they frontload new imports to the early stages of the PR14 period. However, the total import incentives are capped at 0.1% of water activity turnover in any given year during 2015-20, which limits the benefits from trading that can be obtained by importers.

The Water Act 2014 also makes it easier for existing companies and new entrants to trade. Existing water companies are required to provide access to their networks, treatment plants, and storage systems to new entrants, which is intended to facilitate market entry. It also provides a formal framework for owners of small-scale water storage to sell excess water to public supply (Water 2020 - promoting markets, pp. 6).<sup>10</sup>

Stakeholders have noted that the introduction in PR14 of a totex approach to cost assessment and cost recovery and the water trading incentives has been a step in the right direction, but the full effect of these changes are yet to be seen. Some stakeholders have suggested that stronger economic incentives may be required in order to provide sufficient motivations for companies to engage in trading. Other stakeholders have also noted that the five-year time limit on the economic incentives is too short and poorly aligned with the lifetime of the assets that companies need to invest in, in order to improve system interconnectivity.

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<sup>10</sup> Water Act 2014 also includes provisions that will extend the scope of the existing water supply licensing framework, which will facilitate trade. Details of this topic will be covered in greater details in Section 4.2.

**Box 1: Case Study: South East England**

The South East (“WRSE”) Group was set up in the 1990’s to “develop a regional water resources strategy which will contain a range of options to find the best long term solutions for customers and the environment in the South East of England”.<sup>11</sup>

The group members include six water companies as well as regulators and other<sup>12</sup> stakeholders. The group covers a total of 34 separate WRZs across the South East of England and serves a population of 17.6 million.

In 2013, WRSE developed a least cost optimisation model to identify potentially viable strategic options for participating companies to incorporate into their WRMP process and Business Plans. The assessment was carried out for over 1,000 potential options, including 511 demand options, 283 resource options and 267 transfer options.

To facilitate this, companies contributed to the modelling by providing standardised and detailed sets of information, including supply and demand forecasts, costs and timing assumptions on individual options.

The modelling results have been carried out for a range of scenarios, and the key findings included:

- Between 2015/16 and 2019/20, the selected options were split between demand management (27%), supply schemes (36%) and inter-company transfers (37%).
- Beyond 2020, only a small and declining number of demand management schemes were sufficiently attractive. Water transfers and new water supplies formed the majority of the selected options.

The participating companies then had an opportunity to take into account the findings from the 2013 modelling during the WRMP process, although this was not compulsory. While all companies indicated that they considered the 2013 WRSE modelling results when developing their WRMP14, some companies indicated that they were not able to go ahead with some of the options identified. This was the case, for example, where supply/demand information has changed relative to the initial modelling or where additional costs were taken into account.

A similar study had been conducted in 2010 by WRSE, which demonstrated that sharing water resources could reduce the need for new water resources and expenditure. The base case benefits of transfer was estimated to be a reduction in new water resource development required to meet demand by 125 MI/d and a cost reduction of around £500 million. This is reflected in Section 3.2.

The findings above suggest that there may be scope for more water trading in the future, including within the WRSE areas through the options identified. In addition, the lessons learnt from the modelling carried out by WRSE may be successfully transposed to other regions across England and Wales.

<sup>11</sup> This case study has drawn on the following sources of information:

WRSE website (<http://wrse.org.uk/our-aim>), retrieved in August 2015.

Progress towards a shared water resources strategy in the South East of England, WRSE, February 2013

Water Resources in the South East Group: Progress towards a shared water resources strategy in the South East of England, Environment Agency, WRSE, April 2010

<sup>12</sup> Environment Agency, Ofwat, Defra, the Consumer Council for Water and Natural England

## Policies and regulations

Abstraction reform has the potential to have a material impact on the attractiveness and volume of water trading in England and Wales. In particular, the potential to bring in new sources of supply from outside of the water sector (for example, from agriculture), the possibility of sharper price signals and sustainability reductions can have a significant impact, although this may vary across regions and/or companies. These uncertainties may be limiting potential opportunities for trading, for example as companies may not be willing to enter into long-term commercial agreements when they face risks around their future supply volumes. Pressures on water resources, particularly in the South East of England, are likely to lead companies to prefer having control over their own sources of supply to trading (Defra & Atkins 2010).

Environmental policies and regulations form part of the supply characterisation. However, they may also have a significant impact on the attractiveness of water trading and as such their design may in some circumstances constitute a barrier to entry. Water companies often use the Strategic Environment Assessment (“SEA”) and Habitats Regulations Assessment (“HRA”) when evaluating the environmental impact of their trading options.

- United Utilities have discounted a number of transfer options due to environmental factors, such as the potential effects on certain habitats. This impact on the volumes of water proposed to be transferred would need to be agreed with the EA (UU WRMP 2015, pp. 213-4).
- Anglian Water has discounted a number of schemes because of the limitations imposed by sustainability reductions and the EU Water Framework Directive non-deterioration requirements (Anglian WRMP 2013, pp. 90-2).
- In some cases, conflicts between trades and local planning permission rules may also prevent trading from taking place. For example, Southern Water indicated in its WRMP that the timescales for achieving planning permissions and other consents may present uncertainties to resource developments (Southern WRMP 2014, pp. 38).

## Risk perceptions and information asymmetry

Risks (whether actual or perceived) associated with information asymmetry among market participants tend to discourage companies from trading. For example, Thames Water, in their WRMP 2014, discounted 27 of the 30 options of potential bulk supply arrangements on the basis of risk and resilience criteria (Thames WRMP 2015, pp. 25).

Other perceived risks include uncertainties about supply costs and more importantly about supply security. Affinity Water (Affinity WRMP 2014, pp. 141) has expressed concerns about the ability of prospective counterparties to fulfil water supply orders. Separately, Anglian Water has experienced an instance where a trading opportunity was discounted due to *“some uncertainty about the infrastructure required in the Severn Trent system for the alternative source of supply”* (Anglian WRMP 2013, pp. 73). The WRMP has not identified whether this is a reflection of coordination issues or whether the current regulation acted as a barrier to this particular trading opportunity.

Contractual risks may also prevent trade from happening. Lack of information on supply costs, demand location, and resource availability (SVT & EY 2011, pp. 22) creates a risk from the point of view of companies and makes it challenging to formulate long-term plans that involve trading.

Additionally, water trading may affect customer perceptions in different ways. Customers may:

- Perceive a deterioration of service quality if their water supplier exports water into another company's WRZ at times of system stress. Severn Trent considered that this is because customers will see a reduction in the volume of water supplied in their area and may not fully appreciate that in a strict economic sense, the relative value of water may still be higher in another region, despite water stress experienced directly by these customers (SVT & EY 2011, pp. 22).
- Be affected by changes to the perceived water quality and taste, for example as a result of water being sourced from other areas and mixed with the incumbent's water. While the drinking water may still meet all the regulatory criteria (for example, as set by the Drinking Water Inspectorate ("DWI")), customers may perceive a change and this may be negatively received. Conversely, water quality could also improve for some customers as a result of mixing different sources of water, although stakeholders have not identified this as a factor. In any event it would be important for water companies to engage with their customers to assess what the overall impact of water trading is likely to be. As a result of a positive or negative perception by customers, companies may face financial rewards or penalties through their outcome delivery incentives.

A concern has been expressed by Affinity Water regarding the heightened nitrate level in its imported water (Affinity WRMP 2014, pp. 247-248).

In addition to the factors described above, the structure of the industry itself may have an impact on the volume of trading observed and can act as barriers to trading. This is discussed earlier in Section 2.1.

## Box 2: Case Study: Water trading in Australia, Murray Darling Basin

Australia has a long history of water trading. The key lessons learnt from the Australian experience and observations on transferability of those lessons to the England and Wales context are summarised below.<sup>13</sup>

The development of water markets in Australia started as early as the 1980s and 1990s, with major reforms adopted in 1994 and 2004. Since then, the system has been continually refined to reflect the underlying economic and physical realities of the market.

As a result of these reforms, both physical water trading and water rights trading have expanded rapidly over the past decade. Australian markets trade both 'entitlements' (water rights) and 'allocations' (physical volumes, typically denominated as percentages of entitlements).<sup>14</sup>

Entitlements trading represent the vast majority of water trading in Australia in terms of value (although in terms of volume they are relatively low). Allocations (physical) trading is regionally concentrated in the South Murray Darling Basin ("MDB") and intra-state trading is much higher than inter-state trading.

The total turnover in entitlement trades was just over AUS\$1bn in 2012/13 (or £650m), compared to AUS\$287m (or £190m) in allocation trades. This corresponded to 1,338 GI in entitlements and 6,182 GI in allocations.<sup>15</sup>

The majority of physical trading takes place in MDB, accounting for over 98% (2012/13) of Australia's physical water market activity. The physical trading includes intra- as well as inter-state trading (c. 21% of total volume in 2012/13).

### Impacts of water trading

- **Economic.** Water trading, both in entitlements and allocations, has been seen as beneficial for the Australian economy. The National Water Commission estimated that trading in the southern MDB increased Australia's GDP by A\$220 million in 2008/09.
- **Price signals.** The system has been successful in providing price signals for efficient allocation of water, which has led to a more efficient use of water and a considerable increase in investment.
- **Facilitating investment.** Water trading has led to a considerable increase in investment and benefits from "dynamic changes in the size and composition of water-using industries over time".
- **Resilience and flexibility.** Trading has enabled water companies to remain more resilient during the unprecedented Millennium Drought than they otherwise would have been. Consumers, such as irrigators have progressively adopted water trading as a tool in responding to demand and supply fluctuations. This has allowed them flexibility in operating, managing demand and supply risks and utilising capital.

### Differences between Australia and England and Wales

The lessons on physical trading that can be transferred for the England and Wales context are limited:

- **Geographic concentration.** Australian water trading is geographically concentrated in a single

<sup>13</sup> This case study draws primarily on the following sources of information:

Water markets in Australia: a short history, National Water Commission, Australian Government, Dec 2011  
 Australian water markets report 2012-13, National Water Commission, Australian Government, Dec 2013  
 Detailed case study of the costs and benefits of abstraction reform in a catchment in Australia with relevant conditions to England and Wales, Defra, April 2013

Markets, water shares and drought: Lessons from Australia, What can the water industry in England and Wales learn from Australia's water reform story?, Anglian water, Winston Churchill Memorial Trust, Nov 2014

<sup>14</sup> The focus of this report is on the latter, since water rights reform is outside of the scope of this report.

<sup>15</sup> Murray-Darling Basin traded around 1,044 GI of entitlements (78% of the national total) and 6,058 GL of allocations (98% of the national total).

catchment area (the MDB) of around 0.4m square miles, along river Murray of c. 1,580 miles in length, with overlapping market participants from a variety of sectors. This is different from the regional monopolies that appointed companies have in their respective regions. By contrast, Thames Water operates across a much smaller area of around 5,000 square miles.

- **Storage.** The Australian system relies heavily on a system with large amounts of storage available<sup>16</sup>; with trading being driven by the shares of the total water available in the storage that can be taken out. England and Wales has considerably less storage available for any lessons to be transferable.
- **Agricultural use.** Most of the water that is abstracted in Australia is used in agriculture (c.65%), with only 11% going to public water supply. By contrast, a significant share of water in England and Wales goes to public supply (c. 50%), with only a minority of agricultural abstractions. The incentives for third party participation in trading by downstream users are therefore significantly stronger in Australia.

### Lessons learnt from the Australian experience

The key lessons on physical water trading for England and Wales include:

1. **Market design: simple, low-cost and reliable.** Water trading can enable market participants to deal better with any short-term imbalances, provided that they perceive trading to be “*easy, reliable and affordable*”.<sup>17</sup> Some of the benefits perceived by agricultural market participants in Australia could also be perceived by water companies in England and Wales.
2. **Regulatory and governance framework.** Clarity on the objectives and implementation of any regulatory reforms are key to their success. System codes need to be developed without undue influence by market players with vested interests.
3. **Information disclosure.** Registration systems for water trading have been implemented and found to “*underpin public confidence by showing ownership, encumbrances and trading activity*”. In addition, these have helped uncover the true value of water as an asset (Water market in Australia).
4. **Maximise benefits.** Regulatory reforms that maximise the potential benefits from trading are likely to be most attractive. However, the speed of implementation may need to be balanced against stakeholder concerns around trading. An incremental approach may therefore be appropriate, provided that the delay to the benefits is not excessive.
5. **Clear prioritisation rules.** All states in Australia have set out clear rules on water supply prioritisation (such as for ‘essential human needs’). Such rules provide clarity to market participants on what happens under system stress events, which may address contracting barriers to trading.
6. **Interaction between rights and physical trading.** The Australian experience shows that reforms to the abstraction system can have strong impacts on scarcity and resource management. Any parallel reforms to physical water trading need to ‘work with’ the abstraction reforms.
7. **Long-term planning.** Australia and England and Wales have broadly similar approaches to long-term supply-demand planning. However, due to the uncertainties around long-term supply-demand balances, Australian experience suggests that “*the WRMP process, that is deterministic, reliant on historic climate data, and has a narrow focus on least-cost, does not allow the water industry to best manage future uncertainty*.”<sup>18</sup> More innovative approaches based on the Australian experience may be useful in considering whether the WRMP in England and Wales could be improved upon.

<sup>16</sup> Australia has 84,000 GJ of water storage capacity, compared to 1,600 GJ in England and Wales

<sup>17</sup> “*Most irrigators indicated that they found the process of trading temporary water allocations to be easy (89%), reliable (84%) and affordable (72%).*” (Source: Water markets in Australia: a short history)

<sup>18</sup> Markets, water shares and drought: Lessons from Australia, What can the water industry in England and Wales learn from Australia’s water reform story?, Anglian water, Winston Churchill Memorial Trust, Nov 2014, pp. 45

## 2.5 Potential scope for future water trading in England and Wales

As shown in Section 2.4, economic fundamentals are an important driver of the current levels of water trading in England and Wales. Companies have identified specific fundamental economic factors, including:

- **Low value of water relative to the transportation costs.** This puts an upper limit on the distance over which it makes economic sense to trade water. Abstraction reform, by identifying new sources of water, can enable further trading to take place, in particular if the new sources are located closer to the demand centres.
- **High capex costs relative to the marginal cost of supply differentials.** Companies have often cited high capex costs when explaining the reasons for not progressing with a particular interconnection project. Some stakeholders suggested that this was due to the time limitation on the additional returns that can be earned through the regulatory framework. One stakeholder suggested that there are risks involved in long-term contracting with third parties, in the context of significant uncertainty about future supply and demand balances, which are not adequately compensated through the expected revenues from trading. However, stakeholders and existing literature typically did not articulate how intra-company investments differed from inter-company investments and what implications this had on the incentives to trade (it is important to note that they were not asked the explicit question).

However, companies have also identified a number of barriers to water trading, which were not reflective of economic fundamentals, including in relation to the regulatory incentives, specific policies and regulations, information asymmetry and concerns about customer acceptability.

Therefore, the scope for water trading is likely to be higher than the current levels, provided that these barriers can be addressed. This appears to be consistent with Ofwat's own analysis and modelling on the potential scale for water trading (full results can be found in Section 3.2), as well as with WRSE work (see Box 3). These findings indicate that more water trading than is currently observed in England and Wales could be achieved.

The non-economic barriers to trading could in principle be addressed through regulatory and/or policy intervention, with the result that the new levels of trading would increasingly reflect the economic fundamentals of the market.

Building on the observations above, the report further considers the following:

- A summary of existing literature and analysis on the costs and benefits of water trading in England and Wales (Section 3).
- An assessment of the relative importance of the barriers to trading. The analysis of barriers, based on stakeholder engagement, is summarised in Section 4.1.
- An assessment of potential mitigation options for the barriers. Specific measures that address identifiable barriers are discussed in Section 4.2.

### 3 Costs and benefits of water trading

Increased levels of trading among water companies, including potential new entrants, may be beneficial to consumers and the environment. The benefits could arise from:

- Lower overall costs (a portion of which could be passed on to customers);
- More resilient water supply; and
- More environmentally-friendly water abstraction rates.

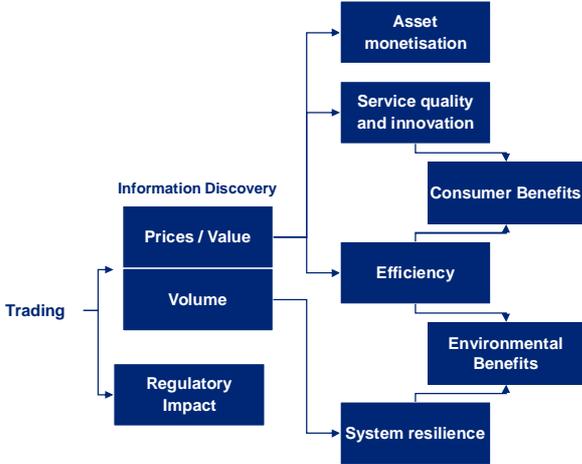
This section summarises the existing literature and research on the costs and benefits of increased water trading in England and Wales. In addition, this section reflects the latest cost-benefit analysis and modelling by Ofwat, which has been reviewed and updated in 2015.

#### 3.1 Potential costs and benefits of water trading

##### 3.1.1 Types of benefits from water trading

The main potential benefits from increased water trading identified in the literature are summarised in Figure 8.

Figure 8: Water trading benefits



Source: Deloitte analysis

The potential benefits that increased water trading may lead to are not always monetary and/or cannot be explicitly quantified. In addition, the benefits may be perceived differently by various stakeholder groups, and therefore may not be equally valued by them. The categories of stakeholders who might receive specific types of benefits are summarised in Table 5. Their materiality cannot be assessed without reference to a specific market design model since design itself has an impact on the importance of individual benefits. For example, the structure of economic incentives for trading, particularly related to value sharing between consumer and companies, has a bearing on the materiality of consumer benefits.

**Table 5: Stakeholders benefitting from water trading**

<b>Benefit</b>	<b>Major stakeholder groups benefitting</b>
<b>Information discovery / price formation</b>	Water companies New entrants
<b>Efficiency</b>	Water companies New entrants
<b>Service quality and innovation</b>	Consumers New entrants
<b>Monetisation of asset base</b>	Water companies Shareholders
<b>End user water bills</b>	Consumers
<b>System resilience</b>	Consumers
<b>Environmental benefits</b>	Consumers Third parties
<b>Regulatory impact</b>	Water companies New entrants

Source: Deloitte analysis

The remainder of this section describes the potential sources of benefits in further detail.

### Information discovery and price formation

Water trading allows market participants to obtain information on the value of water through the price formation mechanism. This then allows them to more accurately value their existing assets as well as potential investments, and may even facilitate financing of new assets (Queensland Government Business and Industry Portal).

Markets also enable information from a large number of individual local players to be reflected in a coordinated manner. Indirectly, markets allow local stakeholders to have a greater influence on the investment decisions being made, such that their local knowledge of their specific requirements is adequately considered (Valuing water 2010, pp. 9).

In cases where water companies may have limited incentives to understand their own cost structure (Ofwat 2008, pp. 3), trading may strengthen the incentives for firms to discover their own cost structures. Through trading and the price signals formed as a result of the interactions among market participants, new cost information can be revealed to other market participants, as well as the regulator. This can in turn serve as the basis for increasing the efficiency in the market.

### Efficiency

Introducing a market mechanism to the upstream water sector has the potential to improve the efficiency in the water sector by providing information and incentives to market participants that can enable companies to reduce costs and improve their business plans.

Historically, regulatory tools such as efficiency targets have been used to encourage water companies to deliver better quality services at a lower cost; Ofwat estimates that bills are on average £100 a year lower than they otherwise would have been (Ofwat 2008, pp. 20). However,

under imperfect and asymmetric information, such regimes provide limited incentives for individual companies to reveal private cost information which may in turn lead to sub-optimal policy design and outcomes.

By delivering more information on the relative costs and value of water, trading creates more incentives for market players to identify potential cost reduction opportunities in sourcing water supplies, transportation or water treatment, and to improve the quality of services they provide. This in turn can lead to improvements in different types of efficiencies:

- **Productive efficiency.** A more efficient water supply provides the same services using fewer inputs. By identifying profitable trades, trading enables services to be delivered at a lower overall cost, thereby improving the productive efficiency of the industry.
- **Allocative efficiency.** A more efficient water supply system delivers the services that are required by the customers. Trading allows companies to focus more on their customers to deliver services in a more efficient way. This mechanism can work in conjunction with Ofwat's emphasis on companies' customer focus (PR methodology 2013, pp. 64).
- **Dynamic efficiency.** New challenges facing the water industry, such as climate change, population growth and greater customer expectations require companies to adapt and find new solutions over time. Trading, by providing effective price signals, enables companies to continually review their resource use, to identify innovative approaches and to continue improving on the service delivery over time.

### Service quality and innovation

In parallel with improving the industry efficiency, market trading has the potential to create incentives for incumbent companies as well as new entrants to identify new and improved ways to serve customers. Such incentives are likely to lead to more innovative approaches being developed, as water companies will be aiming to reduce their costs as well as to improve service quality and ways of delivery (Valuing water 2010, pp. 9). For example, for large customers, this can include new billing options and new types of contracts, such as interruptible and off-peak supplies (Ofwat 2008, pp. 36).

### Monetisation of asset base

Financial benefits from allowing for upstream trading do not only accrue to customers, but also to water companies and their shareholders.

As a result of the price formation process, trading provides information to water companies on the value of their existing assets and resources. This may in turn allow water companies in surplus areas to monetise and/or realise greater value from their existing resource base. They could do so for example by selling their surplus water, which may otherwise have remained unused or under-used.

This would benefit both consumers in areas with water shortage, who would indirectly gain access to lower cost sources of water, as well as the shareholders of the incumbent water company that has been able to monetise its existing asset base.

### End user water bills

As a result of trading, companies are expected to have better information, as well as stronger incentives, to understand their costs and make better investment decisions. This has the potential to reduce the total costs of water supply (such cost savings are described in Section 2.4). In parallel, as retail competition is introduced, the quality of upstream water services are expected to be higher as companies have an incentive to improve on the quality of their customer services in order to increase their market share.

Overall, there is potential for cost savings to be made. If a portion of these savings are passed on to end customers, this would reduce customers' bills relative to what they would otherwise have been.

### System resilience

Defra considers that an increase in water trading and transfers between companies is one of a number of possible ways to address supply-demand imbalances in England and Wales (Defra 2013, pp. 5). Currently, water companies are required to make long-term plans to serve customers' water demand in their respective supply areas and to ensure adequate security of supply.

Trading in the upstream market provides water companies with an additional source of water to fulfil their supply obligations, potentially at lower costs and at a lower risk to the environment (Valuing water 2010, pp. 34). By enabling water resources to be transferred to areas of shortage, particularly at times of drought, trading has the potential to strengthen the overall system's resilience to adverse weather impacts.

### Environmental benefits

More efficient use of water resources facilitated by the upstream markets will also entail significant environmental benefits, as the vast majority of the environmental impacts of the water supply industry can be attributed to their upstream activities (Valuing water 2010, pp. 34). Fundamentally, environmental benefits can be driven by either re-allocation of supply (if water is transferred) or reductions in final demand.

- **Abstraction.** Trading has the potential to enable companies to reduce or avoid over-abstraction in areas where abstraction may already be at or above sustainable limits, thus posing a potential threat to the environment. Water trading could, subject to cost and technical constraints, deliver more water into areas where water supply is under stress.
- **Large capital projects.** Trading of water may enable companies to defer, or even avoid, development of major capital projects that are potentially harmful to the environment such as building dams (International Rivers). This could be the case if, for example, companies were able to substitute water trading with new suppliers for investment in developing their own water sources.
- **Consumption efficiency.** As trading provides water companies with incentives to reduce costs, they may focus more on leakage improvements in the distribution process and on

developing a more efficient water treatment process, which could reduce water demand. Stronger market price signals faced by water companies, if passed on to customers, may also encourage end users to use water more efficiently. Opening non-household retail markets would serve as an additional supporting mechanism for the development of more efficient water consumption patterns.

- Greenhouse gas emissions.** Depending on the changes to the overall patterns of water transfers within and across companies, trading may either reduce or increase indirect greenhouse gas emissions if less or more additional water pumping (which requires electricity) is needed. The overall impact of trading on the industry’s greenhouse gas emissions<sup>19</sup> needs to be assessed for individual projects on a case by case basis.

**Regulatory impact**

Ofwat has indicated that with the introduction of markets, it may be possible to reduce the extent to which the water sector is regulated, for example in terms of price controls. This is because markets are expected to provide greater protection to customers, and a lighter-touch oversight may be sufficient (Ofwat 2008, pp. 36-37).

However, the regulatory impact may go in the opposite direction as additional regulatory oversight may be required, at least initially, to monitor the functioning of some elements of the new markets.

**3.1.2 Types of costs of water trading**

In addition to the benefits described in Section 3.1.1, there may also be costs associated with increasing the levels of water trading in England and Wales, including direct financial costs as well as environmental costs driven by increased water pumping and associated CO<sub>2</sub> emissions embodied in the electricity consumed (see footnote 19). An overview of potential costs of water trading is provided in Table 6.

**Table 6: Potential costs of water trading**

Cost	Materiality	Major stakeholder groups bearing the costs
Set up costs and ongoing costs		Water companies New entrants
Cost of capital		Water companies Shareholders
Water quality		Water companies New entrants Consumers

Source: Deloitte analysis  
 Note: Consumers may be further affected depending on the extent to which these costs may be passed through to end consumer bills.

<sup>19</sup> The overall volume of greenhouse gas emissions for the UK is not expected to change as a result of changes to the water industry. This is because the underlying CO<sub>2</sub> price is embedded in electricity prices and the emissions are limited by the EU Emissions Trading System (“EU ETS”) cap.

The remainder of this section provides further detail on the individual categories of costs associated with water trading.

### Implementation set-up and ongoing costs

**Initial set up costs** of water trading could be significant, although there is currently limited evidence available on the actual quantum of such costs. Ofwat considered that *“Introducing competition in the water and sewerage industries may incur a range of potential costs, many of which have been substantial in other utility sectors”* (Ofwat 2008, pp. 37). The actual quantum of initial set-up costs is likely to differ across industries, driven by the specific market model adopted, scale, complexity and speed of implementation. It is therefore difficult to estimate the likely magnitude of the costs for the water sector simply by comparison to other sectors.

These costs could include:

- Construction of the required physical infrastructure in order to enable trading, such as distribution capacity; and
- Non-physical infrastructure, such as developing templates for trading agreements, development of a trading function, setting up of new IT systems and setting up of new billing systems (Ofwat 2008, pp. 37).

Trading would also involve **ongoing costs**, primarily related to the transportation of water and the associated energy cost for water pumping. The costs of transporting water are summarised in Section 2.4.1. In addition there would be ongoing transaction and marketing costs, as well as semi-fixed costs associated with specific staff overseeing the day-to-day trading activities.

In parallel with that, water companies may also incur additional costs of complying with any data disclosure and/or monitoring rules required by the regulators. This may include staff acquisition, training and salary costs and additional IT systems. The materiality of these costs will depend on the extent to which the regulatory framework will require increased levels of reporting to be carried out by companies.

Finally, if water trading led to the introduction of new water flows to the system, and if it caused changes in water pressure, this might create a risk of increased leakage and associated maintenance costs (SVT & EY 2011, pp. 38). However, this issue could also arise with other new sources of supply, including those owned by the incumbent water company.

### Cost of capital

There is a perception that increased levels of trading could make water companies take on additional risk in relation to delivering on their supply obligation, as well as in terms of maintaining their market share.

This is because cost of debt for water companies is driven by rating agencies' assessment of likely cost recovery and risk of default. Ofwat recognised that the relevant factors include *“regulatory environment, asset ownership mode, operational characteristics of the company in question, asset risk, stability of the business model, quality of management and financial structure”* (Cost of capital,

Ofwat 2011, pp. 23). Introduction of trading, particularly through increased competition, could have an adverse impact on a number of these factors under the existing abstraction regime.

For example, Moody's, a credit rating agency, suggested in 2014 that over the medium to long term, the impact of the Water Act 2014 measures, "*specifically those to expand competition will increase the business risk profile for the water and sewerage companies in England*" (Moody's).

However, the actual impact of introducing trading in the water sector on the cost of capital is likely to be minor. Stakeholder engagement has not identified the impact of trading on the cost of capital as a significant cost of trading, and some stakeholders have indicated that it would be a very small factor.

### Water quality

Water trading may result in mixing of raw and/or treated water from different sources, which may result in water quality issues:

- **Raw water trading.** From the perspective of wholesalers, they would be responsible for ensuring the treated water quality (as regulated by the DWI). Water flows from sources outside of a company's control may increase their perceived risk in relation to maintaining the overall quality, or actually reduce it. Companies may also be concerned that they face a higher potential liability through a risk of penalties being incurred as a result of not meeting the DWI standards.
- **Treated water trading.** From the perspective of consumers, changes to the water source mix may affect the perception of quality, such as taste, hardness and/or odour. Treating the new mix of water differently in order to maintain the former quality may have an impact on the costs to the companies (these can either increase or decrease, depending on the relative quality of water sources being mixed).

## 3.2 Review of quantified costs and benefits from water trading

As outlined in Section 3.1, a higher volume of water trading may lead to an increase in both costs and benefits to a variety of stakeholders. This section summarises the existing literature and research on the overall balance of costs and benefits.

**Table 7: Previous studies on quantification of costs and benefits from water trading**

Source	Category of benefits	Quantified benefits	Findings
<b>Ofwat (2010)</b> <sup>20</sup>	Lifetime cost saving, across England and Wales	£959m (2007/08 prices)	<ul style="list-style-type: none"> <li>NPV of proposed inter-company and intra-company interconnections, adopted in lieu of schemes in water companies' WRMPs.</li> <li>Of the 31 interconnections with positive NPV, 13 were intra-company and 17 were inter-company.</li> <li>Ofwat consider this to be the lower bound on the total potential benefits.</li> <li>Top 10 most valuable interconnections in the south and east of England.</li> </ul>
<b>Cave (2008)</b> <sup>21</sup>	Productive and dynamic efficiency	Initial savings: £280m* Long-term savings: >£3.5bn*	<ul style="list-style-type: none"> <li>Driven by assumptions on 5% increase in productive efficiency and a 0.25% increase in dynamic efficiency a year for 10 years.</li> <li>The upfront savings correspond to 3.5% of total turnover.</li> </ul>
<b>Cave (2009)</b> <sup>22</sup>	Lower financing costs	£280m*	<ul style="list-style-type: none"> <li>NPV of reducing the financing costs for small companies, over a 30-year period.</li> </ul>
<b>WRSE (2010)</b> <sup>23</sup>	Lifetime cost savings (regional)	£501m*	<ul style="list-style-type: none"> <li>NPV savings based on least-cost modelling across the WRSE group for the planning period to 2035.</li> <li>The baseline model includes demand management schemes, but excludes environmental and social and carbon costs.</li> <li>See Box 3 for further details.</li> </ul>
<b>Anglian Water, Cambridge Water, Essex &amp; Suffolk Water (2010)</b> <sup>24</sup>	Capex and opex savings	£28.2m capex and £0.45m/year opex (2007/08 prices)	<ul style="list-style-type: none"> <li>Net capex and opex savings from schemes developed as an alternative to the AMP5 company proposals.</li> <li>Two specific interconnections between Essex &amp; Suffolk Water and Anglian Water, and between Cambridge Water and Anglian Water.</li> </ul>

Source: Deloitte analysis and sources cited in the table

Notes: Savings marked with an asterisk (\*) have not provided information on the base year in which prices were reported.

<sup>20</sup> A study on potential benefits of upstream markets in the water sector in England and Wales, Ofwat, March 2010, pp. 17.

<sup>21</sup> Independent review: of competition and innovation in Water Markets, November 2008, pp. 71.

<sup>22</sup> Independent review: of competition and innovation in Water Markets: Final report, April 2009, pp. 91.

<sup>23</sup> Water Resources in the South East Group: Progress towards a shared water resources strategy in the South East of England, Environment Agency, WRSE, April 2010, pp. 3-4.

<sup>24</sup> Trading theory for practice – a report on opportunities for water resources sharing in East Anglia, Anglian Water, Cambridge Water, and Essex & Suffolk Water, November 2010, pp. 15.

**Box 3: WRSE Modelling results - 2010**

WRSE Group has explored opportunities for more efficient sharing of water resources across the South East of England, and has identified a number of specific opportunities, including trading, for doing so. This box summarises the key findings from the analysis, which were published in 2010.

**Key findings**

- Across the region, in a dry year, there is on average 272 Ml/day of surplus water available, representing 6% headroom of supply over demand. The headroom is only 120 Ml/day during a ‘critical period’ planning scenario.
- The availability of surplus water resources is unevenly distributed and some WRZs are in surplus and others in deficit.
- Individual water companies’ plans, as summarised in the WRMPs, were estimated to result in surplus water being available in the region that exceeded the target headroom of 311 Ml/day at the end of the planning period.
- WRSE members tested thirty three alternative scenarios through a least-cost model framework. This modelling identified combinations of resource sharing opportunities that could lead to an overall cost saving.
- Overall, the scenario that optimises resource use across the whole region was found to lead to a cost reduction of £501 million over the planning period, on a discounted basis (price base year not provided), as compared to the scenario that is similar to companies’ WRMPs.
- The report concluded that “on a like for like scenario basis, the regional solutions will typically cost less than the sum of the individual company plans”.

*Source: Water Resources in the South East Group. Progress towards a shared water resources strategy in the South East of England. Final Report (Version 8, April 2010)*

**Box 4: Ofwat updated water trading modelling (2015)**

In 2015, Ofwat updated the quantitative analysis of the scope for trading in England and Wales originally carried out in 2010. The update incorporated data from the final 2014 Water Resource Management Plans and introduced a number of refinements to the 2010 approach, including a more robust method for allocating trades, calculating distances and an updated assessment of interconnection costs.

Ofwat's base case suggested that the overall magnitude of the scope for net benefits estimated from increased interconnection is circa £914 million (net present value terms in 2012/13 prices) over the lifetime of the assets compared to the schemes identified in water companies' 2014 WRMPs. The benefits corresponded to a total volume of 284 Ml/d of water being traded across 16 interconnection schemes. Of the schemes, 13 were identified between appointed companies and three were within existing companies' boundaries, which corresponds to internal transfers. The majority of the 16 interconnections were found in the south and east of England.

A number of assumptions are embedded in these results and Ofwat carried out a range of sensitivity tests on them. The large number of assumptions reflects the limited information on costs of resources, water company infrastructure and the characteristics of any potential interconnections. Across all the scenarios the cost savings (in 2012-13 prices) from greater interconnection ranged from £754 million to £1,077 million.

As Ofwat's approach was based on a simple static analysis it only captured to a limited extent the potential scope of further interconnection across England and Wales. Ofwat did not claim that any individual interconnection it identified would be cost-beneficial and it noted that a full assessment would require significant further information and modelling. Instead, the objective of the Ofwat methodology was to provide an indication of the scale of the potential value that could be generated through increased interconnection both within and between companies.

*Source: Ofwat 2015*

As set out above, the literature has identified, and in some cases quantified, a number of costs and benefits related to increased water trading in England and Wales.

The market design options set out in Section 4 are informed by the findings on the costs and benefits and identify options that are likely to deliver the benefits, while avoiding, or minimising, any associated costs.

## 4 Barriers to water trading and options for mitigation

Existing literature and engagement with stakeholders has found evidence of barriers to trade in the water industry and has identified potential options to mitigate these barriers.

In Section 4.1, barriers to water trading are assessed in terms of their importance, based on how frequently they have been raised by stakeholders during the engagement process and whether they have also been commented upon in existing literature. In Section 4.2, options to mitigate barriers to trading are examined.

As set out in Section 2, barriers to trading have been identified by distinguishing factors that can be addressed through regulatory intervention (as opposed to economic fundamentals, which cannot be addressed in this manner and are not covered in this section).

### 4.1 Barriers to trading

This section sets out the main barriers to water trading, taking into account the existing literature, stakeholder engagement and discussions with Ofwat and assesses their relative importance.

#### 4.1.1 Summary barriers to trading

The most important barriers identified in this report are highlighted in Table 8. Stakeholders have highlighted security of supply, insufficient tradeable volumes and information asymmetry as the most important barriers to trading.

**Table 8: Barriers to trading: ranking summary**

Barrier to trading	Overall importance
Security of supply, control and reliability	
Information asymmetry	
Policy and environmental barriers	
Water quality	
Weak incentives to trade: export and import incentives and totex	
Marginal pricing	
Uncertainty on the marginal value of water	
Lack of interest	
Other: contract negotiations	
Other: cultural barriers	
Other: reputational concerns	
Other: resilience-only investments	

Source: Deloitte analysis. The assessment of the overall importance is based on Deloitte analysis of the literature and stakeholder engagement.

## 4.1.2 Assessment of barriers to water trading

This section summarises the stakeholder engagement outcomes as well as existing literature and research on barriers to water trading in England and Wales.

### Security of supply, control and reliability

Water companies have a supply obligation towards the customer base in their appointed area, as a result of which security of supply plays a major role in water companies' decision making process. Although Ofwat no longer requires companies to be assessed using a Security of Supply Index ("SOSI") measure, seven companies have SOSI as one of their performance commitments at PR14, of which three companies face a financial penalty under the Outcome Delivery Incentive in the event that they do not achieve their performance commitment.

Stakeholder engagement has indicated that companies tend to perceive their own water supplies as more reliable than imported water supplies, and this has in the past limited the extent to which they were willing to consider trading water independently of the economic attractiveness of such schemes. This barrier to trading has been mentioned by a majority of stakeholders, and a number of them reported it to be the single most important barrier to trading. One stakeholder suggested that there may be a bias towards protection of donor companies under the current licence conditions (although further details on this have not been provided). This forms the basis of companies' preference for relying on their own supplies.

Related to this, the perceived counterparty risk is also an issue that had been highlighted in the literature. Defra reported that the negative experience from the periods of drought since the 1990s has left many stakeholders sceptical about the reliability of bulk supply arrangements, and that this is unlikely to be mitigated through regulatory change. Defra suggested that a wider collaborative approach to planning and management of interconnectivity schemes, underpinned by greater transparency, may be required (Defra & Atkins 2010, pp. 27).

On balance, it appears plausible that from the perspective of water companies, there are more risks attached to water trading compared to developing own water sources. This is because the risk of non-delivery of a particular source can be internalised when a company's own source is considered (in particular since companies' intra-connectivity tends to be well-developed), whereas there would need to be explicit contractual penalties associated with non-delivery to a third party. This type of risk aversion is a common characteristic of market participants in other industries.<sup>25</sup> Better contracting approaches and economic incentives that are better aligned to the long-term nature of the investment in interconnection may be appropriate measures to mitigate this barrier.

However, companies may be combining the security of supply barrier with cultural issues. A small number of stakeholders described the security of supply barrier as a 'behavioural' or 'cultural' issue. It is not possible to determine where the exact boundary between risk aversion and cultural barrier lies based on the information currently available. A design of the water market that overcomes such cultural biases may therefore be appropriate.

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<sup>25</sup> In the electricity market there have been concerns on the link between vertical integration and market liquidity that have led to the introduction of measures to facilitate trading options for new entrants. This has led Ofgem, the regulator, to introduce new 'Secure and Promote' licence conditions to address this issue.

## Information asymmetry

Market participants interested in identifying new opportunities for trading face ‘search costs’ as well as an information barrier to trading when they seek to identify areas with the greatest potential for trading. The information required for this includes detailed information on supply and demand forecasts, relative water scarcity and the marginal costs of developing new sources. If such information is not readily available, this may lead companies to being unable to evaluate projects’ economic viability and may act as a barrier to entry (SE Water and Frontier 2015, pp. 2).

Incumbent companies are required to publish a considerable amount of information in their WRMPs. This included, for the first time in WRMP14, an updated set of guidelines (EA, Defra & Welsh Government 2012, pp. 10) that required companies to consult with third parties on the potential supply options and solutions. While this has led companies to include such options in their appraisal framework, there has not been a significant change to the volume of third party schemes being taken up.

Regional initiatives such as WRSE and Water Resources East Anglia (“WREA”)<sup>26</sup> have demonstrated that companies are able to develop information-sharing platforms that enable them to identify and assess new trading opportunities with relative success. However, such initiatives have been ad-hoc and do not ensure that the most attractive interconnections are developed across the whole of England and Wales. Section 5 sets out market design options that help identify trading opportunities in all regions, rather than in the South East of England only.

Stakeholders’ view on the information asymmetry as a barrier to entry has been somewhat mixed. A majority of respondents indicated that there are barriers to water trading deriving from lack of information on potential opportunities that could be explored, reflecting an asymmetry of information among incumbents and new entrants. Some of these stakeholders have indicated that the information in the WRMPs is not necessarily easily accessible.

However, a number of respondents indicated that the current mechanisms for information sharing, notably through the WRMPs were adequate and sufficient. Some stakeholders have also noted that the disclosure of commercially sensitive information through the WRMP process may put companies at a negotiating disadvantage in relation to potential trading opportunities.

Several stakeholders have also noted that there may be limited information available on other sources of water that may be available, notably unused abstraction licences and surplus water from non-water sectors, such as agriculture.

On balance, it appears that a significant number of market participants perceive the information availability as a barrier to trading, although this is not a view shared by all the market participants.

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<sup>26</sup> WREA is a project that brings together water companies in East Anglia, with an aim to develop a long-term water resources strategy for the region. The companies include Affinity Water, Anglian Water, Cambridge Water, Essex & Suffolk Water and Severn Trent Water. The project also covers sectors other than water, notably agriculture.

## Policy and environmental barriers

There are a number of policy and environmental barriers to trading perceived by companies.

- **Abstraction licences regime.** Defra found that uncertainty about the form of the future abstraction licences regime, for instance due to proposals for time-limited licensing, may be a barrier to trading.<sup>27</sup> This lack of transparency makes it challenging for companies to assess specific opportunities for trading and is likely to lead them to prefer developing their own sources of supply rather than trading (Defra & Atkins 2010, pp. 48). Severn Trent noted that such time limits may reduce the number of economically viable projects that can be identified, as only those projects that can repay the initial investment within the lifetime of the abstraction licence will be attractive to companies (SVT & EY 2011, pp. 22). Stakeholder engagement has corroborated this concern, as several companies have expressed their concern about the uncertainty around the abstraction licences regime posed in relation to negotiating long-term contracts.

These barriers cannot be mitigated through the design of the water market. However, the model should aim to be relatively 'future-proof' to changes to the existing regime.

- **Pricing regime.** Some stakeholders have expressed a concern about the lack of policy guidance on pricing rules for third parties, and in particular inset appointees. They have expressed a concern that there is currently limited guidance on such pricing, and a lack of clarity on whether prices that differ materially from the bulk supply tariff are allowed or whether they may be perceived to be price discriminating (although they did not specify whether they are concerned about the licence conditions or the Competition Act). They suggested that additional guidance may be helpful, to provide assurance to companies that they are not in breach of non-discrimination rules.

However, such guidance may limit the flexibility and/or the level of innovation of other pricing approaches and would go against Ofwat's objective of encouraging companies to take ownership of their activities. On balance, additional guidance may not be required, as companies are able to procure their own legal advice on such matters.

- **Environmental regulation.** Companies perceive that they face a more complex set of regulatory requirements when considering potential interconnections with other companies. For any interconnection projects, companies need to demonstrate to the EA the projects' environmental soundness, and to DWI that the project does not lead to a deterioration in water quality. This may be perceived to be less costly and onerous compared to developing their own resource (even though these also need to comply with the relevant environmental and water quality regulations).

An ongoing dialogue among regulators can help ensure that the policies implemented are consistent and mutually supportive. As an example, Ofwat could work with EA and DWI to ensure that the environmental regulation is aligned to the market design.

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<sup>27</sup> The current abstraction regime in itself may also represent a barrier to rights trading. However, a consideration of the non-physical trading is beyond the scope of this report.

- **Regulatory certainty.** Several stakeholders have noted that more generally, a degree of uncertainty surrounding the stability of the regulatory framework may sometimes act as a barrier to trading, particularly in relation to developing long-term trades.

This is a common issue across network industries and different regulators have sought to provide the required degree of certainty in different ways. Relevant examples from other industries are considered further in Appendix A

### Water quality

Water quality can reflect two different parameters: ‘regulated’ quality such as drinking water standards monitored by the DWI and ‘perceived’ quality such as taste and odour. Increased water trading may introduce challenges or favourable opportunities to both types of quality. Such considerations may sometimes be considered to be barriers to trade, but this is not necessarily the case in all circumstances.

Anecdotal evidence suggests that unexpected challenges to water quality, such as pesticide contamination, can cause companies to perceive water trading as relatively risky. For example, Affinity Water had to implement a number of measures to overcome water quality issues related to *“receiving bulk imports of water from various water treatment works operated by various companies which may be at risk of exceeding the standards for metaldehyde and total pesticides”* (DWI Ref No: AFW 3389, pp. 1). However, this can also be a problem for companies in relation to their own supply sources and is not related only to trading.

Quality issues perceived by customers, such as changes to taste and/or odour due to the mixing of supplies from different sources, are also relevant barriers. Such changes in taste and odour may lead to customer perception of poor water quality and customer complaints (Defra & Atkins 2010, pp. 35), which can ultimately lead to regulatory penalties being imposed on the affected companies. Conversely, there may be improvements in quality resulting from trading that can be considered as opportunities for companies.

A number of stakeholders have indicated that the water quality changes resulting from trading may be a barrier to trade insofar as they limit the ability of companies to transfer water, sometimes including within their own areas. Stakeholder engagement has not indicated that water quality could be a ‘rationale’ for increased water trading. However, it is possible that quality improvements could result from water trading.

On balance, this appears to be an issue that arises only in a limited number of circumstances. In any event, companies are expected to engage with their customers in order to understand their attitude towards mixing water sources for the benefit of system resilience.

### Weak incentives to trade: export and import incentives and totex

Stakeholders have suggested that existing incentives to trade are not sufficiently attractive for companies to engage in trading. This reflected a combination of factors, related to the fact that the incentives are time limited and that the risks undertaken by companies were not being sufficiently rewarded through the scheme. Some stakeholders have highlighted the fact that the incentive structure should be aligned with the long-term nature of the water sector infrastructure.

However, not all stakeholders have considered that the current incentives are too weak – one stakeholder suggested that the incentives for importers of water are not required, since importers should be seeking the most cost-effective options anyway and therefore do not need additional financial incentives.

Historically, capex bias has also created a barrier to trading. A number of stakeholders indicated that they believe there is a continued bias towards capex solutions, driven by the desire to increase the RCV.

In addition, many stakeholders have considered that the move to totex has not been particularly effective in motivating additional trading. Stakeholders have cited different reasons for this: some stakeholders did not consider themselves to be affected at all and some believed that any investment opportunity would be assessed on the basis of its own merits in terms of NPV and therefore the move to totex did not make any difference to the assessment. However, some stakeholders noted that investors have historically focused on the growth of RCV by water companies. The move to totex is therefore expected to represent a change from investors' perspective (even though stakeholders have not made such observations).

A few stakeholders who considered that the move to totex has been helpful nevertheless thought that the impact has been limited.

On balance, it appears to be too early to reach a conclusion on the impact of totex and new trading incentives, since both have only been introduced in PR14 after an extended period under the previous regime. It may be appropriate to plan for a comprehensive review of the impact of these measures and to consider whether or not either of them need to be developed further.

### Marginal pricing

There are two separate issues related to the use of marginal pricing in assessing trading opportunities: firstly, whether LRMCs are used by companies, and secondly, whether they are being defined in the same way.

#### Use of LRMC

There appears to be mixed evidence as to whether companies consistently use LRMC for assessing trading opportunities as part of their cost-benefit analysis. A small number of stakeholders indicated that the revenues from trading through the use of non-marginal-pricing are inadequate, but they did not elaborate on the details.

The literature has also identified a similar issue, in that bulk supply prices have typically been set in relation to average cost, rather than marginal cost (SVT & EY 2011, pp. 20), but without explaining why companies are unable to negotiate prices in relation to marginal costs.

In the event that not all companies use LRMC on a consistent basis for making trade-related pricing decisions, then a shift to marginal cost assessment may help uncover a larger number of trading opportunities than has been the case to date. To encourage this, additional guidance may be appropriate.

## Common LRMC approach

In addition, the water industry currently lacks a common marginal cost-based pricing model, which may distort trade economics and efficiency. One aspect of this is that abstraction licences are not currently priced to reflect regional differences in water scarcity.<sup>28</sup> LRMCs have historically been used by companies to assess their internal options, but these may not have been consistently defined. If more companies start considering potential trading opportunities more extensively, it may be appropriate that a common definition of LRMC be used consistently across all water companies. Several stakeholders have noted that the lack of guidance on appropriate pricing methodology has acted as a barrier to trading.

As a result, it may be helpful if a methodology guidance on the boundaries on costs to be included in the LRMC assessment is developed and applied across all companies. This would help ensure that all companies assess potential trading opportunities in the same way and would provide greater certainty to new entrants on the approach being used to evaluate their proposals.

## Cultural barriers

There appears to be some evidence on the presence of cultural barriers to trading in the water industry.

- Several stakeholders have noted that there appears to be lack of interest from other parties to engage in trading. Interestingly, this has referred to both incumbent companies having some reluctance to consider trading options as well as to potential new entrants having displayed limited interest in trading.
- A small number of stakeholders indicated that since trading volumes have been limited for a long period of time, the lack of interest in water trading has become ingrained in the industry's culture. As a result, incumbents have not traded much, or have not given much consideration to identifying and evaluating potential trading opportunities.
- Other stakeholders have characterised some of the other barriers, such as security of supply concerns, as 'behavioural' and/or 'cultural' barriers, thus conflating the two types of barriers.

On balance, it appears that cultural barriers to trading in the water industry persist, at least to some extent. In some cases, cultural barriers exacerbate other behavioural aspects of the industry, notably risk aversion.

Existing measures, such as the WRMP process, as implemented in the WRMP14 guidelines, have been developed to provide sufficient motivations for both new entrants and incumbents to consider new trading opportunities. However, these do not seem to have been fully successful in overcoming cultural barriers to trading, and it is not yet clear whether updated WRMP19 guidelines, currently being developed, are going to be more successful.

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<sup>28</sup> Overall, these factors have led to a degree of uncertainty about the relative value of water in different geographical locations (as well as over time, for example at times of system stress) and the marginal costs of supplying water. As a result, the scarcity pricing signals are weaker than they otherwise could be, which limits the number of economically attractive trades that market players can identify, compared to a situation where the price signals were sharper.

It may therefore not be possible to mitigate cultural barriers in isolation. Rather, a combination of measures that help overcome other barriers to trading identified in this report may be more appropriate. This is reflected in the market design analysis in Section 5.

### Contract negotiations

Some stakeholders indicated that they find it challenging to negotiate complex long-term contracts in an environment where policy and regulatory drivers change at the same time as demand and supply patterns also shift considerably. To facilitate contract negotiations, Defra has previously proposed that a “*regulated model contract for interconnectivity schemes*” could be developed (Defra & Atkins 2010, pp. 46). Ofwat has also published a document (‘Negotiating bulk supplies – a framework’) to help companies with their contract negotiations process. One stakeholder suggested that the industry could benefit from a review of the existing bulk supply agreements and drawing out ‘best practice’ lessons for future contracts.

The reasons why companies may find it challenging to agree contracts include the following:

- Lack of experience in negotiating contracts, due to historically low volumes of trading which increase the transaction costs of agreeing a trading contract;
- Historical use of ‘best endeavours’ contracts that do not help companies to address the security of supply issues; and
- Risk aversion to ‘untried’ options.

These factors are related to each other, and they are also linked to the cultural barriers to trading. Some of these barriers are expected to weaken or disappear over time, as the practice of water trading becomes more prevalent. However, companies may need initial support to overcome this barrier to trading.

### Other barriers

Other barriers to trading cited in the literature as well as by the stakeholders include:

#### Reputational concerns

Companies may have a reputational concern that they may find themselves exporting water at times of system stress in their own appointed area. The concern is that even though market prices provide a signal that it is more economically beneficial to export water, such trading would be socially unacceptable from the perspective of consumers, particularly if they are experiencing a local shortage (SVT & EY 2011, pp. 22).

#### Resilience-only investments

A small number of stakeholders have commented on the fact that schemes that are not expected to be used to transfer water most of the time, but only be in place to enhance the overall system’s resilience are particularly challenging to finance. This may be particularly the case where interconnection between two areas of surplus is being considered.

## 4.2 Barrier mitigation options

This section sets out the options for mitigation of barriers to trading identified in Section 4.1 and assesses their key characteristics. The overall assessment of barrier mitigation options and their characteristics serves as a starting point for the development of market design options in Section 5.

### 4.2.1 Summary barrier mitigation options

Table 9 summarises the ranking of identified barrier mitigation options based on their overall attractiveness, using the measures set out above.

**Table 9: Barrier mitigation options**

Barrier to trading	Suggested mitigation option
<b>Security of supply, control and reliability and reputational concerns</b>	<ul style="list-style-type: none"> <li>▪ Better bulk supply contracts / 'Best practice' contracts</li> <li>▪ Calibrate the incentives between trading parties</li> <li>▪ Risk sharing mechanism</li> <li>▪ Mitigation aligned to the mitigation of the security of supply barrier</li> </ul>
<b>Information asymmetry</b>	<ul style="list-style-type: none"> <li>▪ A clear 'market place'</li> <li>▪ Expansion of the current regional initiatives</li> <li>▪ Disclosure of information from WRMP</li> <li>▪ Disclose unused abstraction licences information</li> </ul>
<b>Policy and environmental barriers</b>	<ul style="list-style-type: none"> <li>▪ Greater clarity on abstraction licence reform</li> <li>▪ Ensure stable regulatory regime – 'no surprises'</li> <li>▪ Coordination among regulators to align policies</li> <li>▪ Develop a common industry code</li> </ul>
<b>Water quality</b>	<ul style="list-style-type: none"> <li>▪ 'Regulated' quality: establish well-defined risk sharing mechanism</li> <li>▪ 'Perceived' quality: encourage customer 'willingness to pay' assessment as part of the WRMP process</li> </ul>
<b>Weak incentives to trade: export and import incentives and totex</b>	<ul style="list-style-type: none"> <li>▪ Address RCV bias</li> <li>▪ Support long-term trade</li> <li>▪ Clearer guidance on allowed location specific pricing mechanisms</li> <li>▪ Review of the totex impact</li> <li>▪ Consider separation of incentives for interconnection schemes</li> </ul>
<b>Marginal pricing</b>	<ul style="list-style-type: none"> <li>▪ Develop a common methodology for establishing the price of the trade on a marginal cost basis</li> </ul>
<b>Cultural barriers</b>	<ul style="list-style-type: none"> <li>▪ Market design can be adapted in order to "create" interest among market participants</li> <li>▪ Obligation on the company in deficit to seek alternative supplies</li> <li>▪ Encourage closer working relationship among water companies</li> </ul>
<b>Contract negotiations</b>	<ul style="list-style-type: none"> <li>▪ 'Best practice' bulk supply contracts</li> <li>▪ Templates for negotiation of specific clauses</li> </ul>

Source: Deloitte analysis

## 4.2.2 Assessment of barrier mitigation options

This section provides further details on the individual barrier mitigation options against barriers to trade set out in Section 4.2.1.

### Security of supply, control and reliability

Stakeholders have identified security of supply concerns as a strong barrier to trading. They considered that companies with a supply obligation are exposed to a risk of penalties if they fail to deliver customers' demand. The current perception is that sources under direct control of the company are more reliable and that there is a contractual risk attached to any third party supplier. As a result, companies perceive it riskier to rely on a third party to deliver part of the supply volume and have a tendency to prefer to use and/or develop their own sources of water.

To mitigate this barrier, the following measures may be considered:

- Bulk supply contracts can be improved to increase confidence in trading. Companies could seek to agree contractual terms for trading that reflect their respective supply obligations. Other key terms to be covered in the improved bulk supply contracts may include the sharing of risks, responsibility for asset maintenance, as well as clearly defining the cost structure and the duration of trades.

Defining the risk sharing mechanism is particularly important, setting out the supply obligations for both parties, possibly ensuring a minimum supply quantity even in case of exporter shortage. As reaching an agreement on particular clauses can be challenging, a contract template with some pre-defined clauses could provide a basis for an agreement or a starting point for negotiation between parties.

- Ofwat could provide further clarification on the definition and allocation of responsibilities under a system stress event. However, this should not be prescriptive and should not interfere with companies' ability to set their own performance commitments, and their option to enter into bilaterally negotiated trading arrangements. Regulatory incentives for market participants could also be calibrated as part of the Price Review process such that where two companies are sharing the same source of water, there is a clear division of responsibilities and penalties for non-delivery.
- Finally, system coordination may be supported by the introduction by a functionally separated system operator. This has been previously discussed by Ofwat in a 2011 paper (Ofwat 2011, pp. 42). Ofwat currently does not propose to functionally separate the System Operator as part of Water 2020 (Water 2020 - promoting markets, pp. 19). There may also be alternative options to system coordination, ranging from the existing WRMP process, to extending the role of the regional entities such as WRSE into a vehicle for national coordination.

Related to the security of supply concerns, companies appear to be concerned with the reputational impact resulting for example from exporting at times of drought. Clear industry guidelines may be helpful to support companies in the event of system stress, in order to avoid

such reputational risks. The risk-sharing mechanism needs to take into account both the exporters' and importers' concerns, such that the arrangements are mutually acceptable.

### Information asymmetry

A framework for information sharing among potential market participants would mitigate risks associated with perceived information asymmetry, particularly between incumbents and new entrants, as well as risks associated with insufficient information being available. For example, market participants may find it challenging to develop credible proposals for trading with incumbent companies, if they lack relevant information (such as marginal costs, location and reliability of potential water sources).

A standardised information platform, such as a clear 'marketplace', may be a convenient tool for potential market participants to register their water needs and availability. It would be accessible to all potential market entrants would enable companies to identify and evaluate new trading opportunities. Some companies have proposed the development of an 'information exchange' to support the information sharing process (SE Water and Frontier 2015, pp. 26).

The industry has already seen small-scale information platforms emerging in specific regions. For example, WRSE have developed mechanisms to exchange information and to cooperate on strategy and planning development. This example could serve in the future as the basis for developing a wider platform, such as a 'national water resources forum' for all market participants in England and Wales.

It may be possible to adapt the WRMP process to reduce the degree of information asymmetry (perceived or actual), for example by deepening the standardisation of information disclosure, such as the underlying data tables. It should be noted that the WRMP process and its development is the responsibility of the EA.

In relation to the information gap, one option could be for EA to disclose information on unused abstraction licences on a regular basis. This would continue to be important if abstraction reform implements changes to the licence allocation system to tackle the challenges of over-issued licences (see Figure 7). More generally, an information-sharing mechanism, where potential trading parties can register their surplus-deficit information and interests, could also mitigate this barrier (this is covered in more detail under information asymmetry).

### Policy and environmental barriers

There is scope to improve transparency of the current regulatory and administrative framework. Water companies perceive uncertainties and risks arising from a lack of transparency and consistency among regulatory and administrative frameworks, which may act as a barrier to trading. Some stakeholders have highlighted the need for clarity on abstraction licence reform and for a stable regulatory regime so that they can optimise their strategies, including where these

strategies involve trading.<sup>29</sup> Some have also expressed a desire for the three regulators (Ofwat, EA and DWI) to coordinate closely to avoid policy misalignment and uncertainties.

In relation to physical shortages of water resources, one option could be for the EA to adapt its abstraction licence rules to allow companies to develop new sources of water specifically for trading purposes, by allowing the “justification of need” to be based on a third party (as opposed to the applicant’s own) needs. However, detailed considerations of the abstraction rights licensing and trading regime is beyond the scope of this report. A degree of coordination is required between the EA and Ofwat on this specific issue as part of aligning their respective regulatory frameworks.

The existing framework could be improved by building on the trading and procurement code that companies are required to develop in order to obtain the water trading incentives. As an initial step in this direction, Ofwat has already developed a framework for negotiating bulk supply agreements (Ofwat 2013, pp. 8-16). This is intended as a list of areas that Ofwat would expect companies to include when negotiating such agreements, but is not intended to be prescriptive in terms of the actual form and content of the contract. However, it is unlikely to be appropriate for the industry to develop a completely new trading code, due to the costs and timelines involved, which at this stage seem disproportionate to the challenge at hand.

The structure of the licensing regime in England and Wales had previously been identified as a barrier to trading, as a result of which Water Act 2014 introduced an option for companies to apply for wholesale-only licences. Stakeholder engagement has indicated that market participants already consider this change to the licensing regime as a given. They also typically considered that this will be an effective driver of increased level of trading in the future, but more clarity and transparency of the policy direction of travel is needed.

### Water quality

The mitigation of the water quality barrier is closely linked with the barriers of security of supply. For ‘regulated’ quality metrics, a well-defined risk sharing mechanism set out in the trading contract may be needed to protect companies against unexpected future events that may lead to a deterioration in water quality. The contract may need to clearly define who bears the responsibility for treating the water and the extent to which the treatment costs (including any unexpected treatment costs) may be reflected in the trading prices.

In relation to the ‘perceived’ quality risks, such as changes to the water taste and/or odour, water companies build on their existing customer engagement processes. Customers may be given an opportunity to express their preferences in relation to the trade-offs involved between perceived water quality and the impact of trading on security of supply and prices.

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<sup>29</sup> Stakeholders have not been asked to comment on the need for abstraction reforms and/or their shape. However, it is plausible that the shape of the reforms, not just clarity, are required to support water market.

## Weak incentives to trade: export and import incentive and totex

### Review of totex and PR14 incentives

With the introduction of totex in PR14, companies are expected to make investment and planning decisions that no longer suffer from ‘capex bias’ observed previously. Similarly, PR14 has introduced stronger incentives for exporters and importers of water.

However, these measures may not on their own to be a sufficient incentive for companies to engage in water trading. Stakeholders have noted that the introduction of totex and export and import incentives have been a step in the right direction, but the full effect of both of these is yet to be seen. Whilst the new system provides companies with a higher return earned over the current regulatory period, the incentives are limited as far as very long-term schemes are concerned.<sup>30</sup> Such incentive structure may be helpful in motivating short-term trades aimed at balancing the immediate supply and demand position, but they may not be strong enough to motivate long-term investment.

A similar view was expressed in a joint paper from South East Water and Frontier Economics, which expressed a concern that the introduction of totex may not be entirely successful in removing the perceived capex bias, and that the water export and import incentives may not be sufficiently strong.

The report suggested that further enhancements may be appropriate, for example through the WRMP process, and proposed that Ofwat should monitor the impacts of the introduction of totex and the trading incentives (SE Water and Frontier 2015, pp. 25).

Additional economic incentives may be required to motivate companies to export and import water. As indicated in Section 2, it appears to be too early to reach conclusions on the impact of totex and new trading incentives and whether or not these need to be developed further. It may be appropriate to initially carry out a comprehensive review of their impact in the next 12-18 months. Following the outcome of the review, Ofwat may wish to consider whether or not either of them need to be developed further in order to support the water market.

### Long-term incentives for trading

Stakeholders have indicated that many trading schemes are long-term in nature and a key economic barrier to trading is the lack of long-term incentive to invest in new schemes connecting neighbouring water companies. Tools that encourage investment in further network integration, particularly across company boundaries, include:

- Encouraging companies to explicitly consider the option of sourcing water from outside of their appointed areas (this is already in place through WRMPs). Initially, this can be implemented by

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<sup>30</sup> One stakeholder suggested that an incentive structure that enables companies to retain part of the economic profits beyond the five-year regulatory period may be required. However, a detailed review of the incentives would be required in order to identify the appropriate length of time for continued incentives and any caps on the total amount earned by a company. This is considered in Appendix A.

incentivising companies to consider all trading options that are proposed to them by third parties (subject to quality criteria) through a reward/penalty mechanism as part of price control;

- Standardisation of these options, such that companies have access to well-formulated alternative supply proposals, from new entrants or existing companies; and
- Clarity on the share of value created from trading that companies may be able to retain and the duration of this. These incentives may include encouraging trading parties to share ownership of interconnection assets to support trade (including by clarifying how shared ownership benefits the RCV of companies involved), facilitating infrastructure investment and extending the five-year time limit<sup>31</sup> on the retention of lifetime economic profits. It may also help some companies to provide guidelines on the pricing mechanism, to clarify how negotiated trading prices may differ from large-user tariffs, including for inset appointees.

The first two points relate to the design of water market and the extent to which market participants should be required to consider alternative supply options. The third point relates to the value-sharing mechanism that would need to be in place in order to provide companies with sufficient economic incentives to trade. This includes value sharing between buyers and sellers of water, as well as between companies and customers. All of these points have been considered in developing the options for market design in Section 5 and are assessed further in Appendix A.

One option to support long-term investment in interconnection may be to allow for separate returns on interconnections<sup>32</sup> to encourage more water trading. This would take into account the fact that some trading schemes<sup>32</sup> are not expected to be fully utilised at 'normal' times, but rather are put in place in order to enhance the overall system resilience. This option is expected to be challenging to implement as it entails the valuation of resilience in monetary terms.

### Marginal pricing

Stakeholders have noted that the lack of guidance on appropriate pricing methodology has acted as a barrier to trading.

One mitigation option would be to develop a common methodology for establishing the prices of the trade on a marginal cost basis and to adapt the WRMP process such that it reflects consistently calculated marginal costs in the selection process of schemes. The benefits of such a common methodology are twofold: first, it provides an efficient price signal to the market, which may help uncover a larger number of trading opportunities that would otherwise have not have been identified under average-cost pricing. Second, it provides additional clarity and certainty on the

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<sup>31</sup> This is consistent with Ofwat's aim to encourage longer-term focus of the water industry set out as part of Water 2020 (Ofwat 2015).

<sup>32</sup> This may be appropriate if the regulated allowed cost of capital is sufficient to support investment within companies' boundaries, but not sufficient to support investment in inter-company projects. One of the reasons for this distinction may be the fact that any intra-company risks from investments are internalised and managed within the company. By contrast, inter-company investments explicitly expose companies to contractual risks for non-delivery.

marginal value of water under a common pricing framework and enables companies to make better decisions.

There are two key areas that the methodology needs to consider:

- **Prices.** Developing prices that reflect the full economic and environmental costs as well as relative water scarcity will strengthen the economic incentives for water companies to identify the most efficient interconnection options.

The introduction of relative scarcity pricing of water depends on the outcome of water abstraction reforms. This report assumes that the pricing of abstraction licences is going to change gradually in the future, to better reflect actual costs of abstraction. As a result, these reforms may reinforce the transition towards clearer scarcity pricing, which would in turn create stronger incentives for trading (Defra & Atkins 2010, pp. 45). It is possible that some components of the new market design will be implemented ahead of abstraction reform. The design should therefore take into account potential changes to the abstraction regime and be developed in a ‘future-proof’ manner. This is reflected in the proposed market design, as set out in Section 5.

- **Access pricing regime.** Separately from the prices used when assessing potential trading options, the Water Act 2014 has reformed the access pricing regime in England and Wales. The regime is currently transitioning away from a cost principle for access to incumbents’ networks and assets, but the form of access pricing that will replace it is not yet known.

A change in the access pricing regime<sup>33</sup> also has the potential to create stronger incentives for trading, since it reduces the ability of incumbents to discriminate against new entrants. However, since the reforms will take some time to be designed and implemented, some companies (SVT & EY 2011, pp. 35) have suggested that water trading can start without the access pricing regime being reformed. Although a more attractive access pricing regime might make water trading in England and Wales more attractive, particularly to new entrants, it is not a pre-requisite for the development of a water market as such.

### Cultural barriers

Several stakeholders have noted that there sometimes appears to be a lack of interest in water trading, and have suggested that this may be a cultural factor, additional to other barriers to trade such as information asymmetry and security of supply risks. There may be a number of potential mitigation options, which are reflected further in Section 5 and in Appendix A, including:

- **Consideration of trading options.** One option to increase the level of interest in trading may be to strengthen the incentives for considering options for trading, potentially even going as far as mandating the consideration of trading opportunities (although not trading itself). This could be implemented at the same time as other key mitigation measures, such as the development of an information-sharing platform.

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<sup>33</sup> Access prices would need to be developed at three levels: access to raw water distribution systems such as river basins, access to water treatment plants and access to treated water distribution system.

- **Regional cooperation.** Regional initiatives such as WRSE may also be encouraged, to the extent that they promote efficient coordination among market participants.
- **Codes.** The development of common operation codes for the industry would aim to provide a level playing field to all market participants through a set of codes and systems that all participants would adhere to. This could encourage new participants to enter the market, as they would see it as more transparent and accessible than it would otherwise be.

### Contract negotiations

These barriers are expected to ease if more trading occurs in the future, as companies progressively gain experience in negotiating bulk supply contracts and 'best practice' emerges. To achieve this, a review of existing bulk supply contracts could be undertaken to extract the key lessons learnt on which types of contracts were or were not successful in the past.

Another option may be for the industry to develop standard contract templates. While it might be impractical to mandate the use of such contracts, owing to unique project characteristics, a set of guidelines or contract clause templates for contractual negotiations could provide a starting point for negotiations and help reduce the transaction costs of trading.

Some stakeholders have also indicated that existing 'best endeavours' contracts are not suitable for addressing the security of supply issues, as identified above. Guidelines for contract structure may be helpful to offer alternatives to this type of contract.

## 5 Options for market design

This section sets out potential market design options for water trading in England and Wales. The proposed options have been developed by taking into account public information, views expressed by third parties during the stakeholder engagement process and the scope for trading, costs and benefits and barriers to trading already covered in this report. It also takes into account feedback from Ofwat and Ofwat's Water 2020 assessment criteria. However, the report has not been through a formal legal advice process. The remainder of this section is set out as follows.

- Section 5.1 provides a brief overview of the issues being addressed based on the identified barriers to trade. It then describes the main market design components to address these issues, and sets out the potential range of options that could be considered for each of those. Finally, the assessment criteria used to compare these options is also described.
- Section 5.2 provides a proposed market model for water trading in England and Wales.
- Section 5.3 summarises potential implementation steps of selected market design options.

Further details of the issues considered in developing the proposed option is set out in Appendix A, including how each option scores relative to the assessment criteria.

### 5.1 Addressing issues through market design

In this report, market design is defined as the framework and rules chosen by regulators and other decision makers to facilitate trade between market participants. This includes factors such as information requirements, processes for assessing trading opportunities, pricing, risk allocation and regulatory oversight.

The design of the water market needs to be developed in a way that takes into account all the relevant features of the market, including physical fundamentals, ownership and regulatory structures, as well as supply and demand characteristics. This is because water trading is only desirable insofar as it enables the industry to achieve its ultimate objectives of lower costs, more efficient use of resources, reduced environmental pressures and increased resilience.

#### 5.1.1 Overview of issues being addressed by the market design

As described in Section 4, a number of issues and barriers have been identified that impact the level of water trading in England and Wales. The main barriers that need to be addressed include:

- Security of supply, control and reliability
- Information asymmetry
- Policy and environmental barriers
- Water quality
- Weak incentives to trade
- Non marginal pricing
- Uncertainty on the marginal value of water

In addition to these barriers, there are other issues that need to be considered when designing a market. For example, minimising the potential for companies to exploit their market power or discriminate against new entrants, or reducing transaction costs associated with the market. This will help ensure a level playing field for all market participants and the functioning of an efficient market.

### 5.1.2 Options for each market design component

To develop the overall market model for water trading, the available options for each of the market design components were identified. These options range from a low level of intervention (for example, where existing arrangements are expected to be sufficient) to a high level of intervention required to further develop the water trading market.

Table 10 sets out the range of options for each component. A more detailed description of the proposed market design option is set out in Section 5.2. Detailed analysis of individual options and the rationale for selected preferred options, as set out in Section 5.1.1, can be found in Appendix A. The recommended option for each of the market design components was selected on the basis of Ofwat's Water 2020 assessment criteria. The design has sought to identify options that satisfy these criteria. Typically, this has resulted in identifying options that are light-touch, targeted at the desired outcomes, lower-cost compared to the alternatives, effective and proportionate to support water trading.

**Table 10: Range of options available for each market design component**

Level of intervention				
Component				
<b>1 Information database</b>	Companies hold information		Central information database created	
Level of participation	Voluntary		Mandatory for all market participants	
Type of information	For companies to decide		Agreed set of standard data	
Level of access	Free access to all information		Market participants only	
Frequency of updating information	As and when changes occur		Annually	
<b>2 Bid characteristics</b>	No standards defined		Defined template	
Access Pricing reforms	Proceed ahead of reforms		Implement after reforms	
<b>3 Assessing bids received</b>	No additional requirements		Mandatory, with rewards/penalties	
Frequency	Every five years (in line with WRMP)		Ongoing	
Disclosure of bids	None	Voluntary	Mandatory via information database	Mandatory via annual reports
<b>4 Bid assessment methodology</b>	No defined methodology		Tightly defined methodology	
Recourse option	No defined process		Common process via Ofwat	
National coordination	Not required at this stage		Regional coordination	Mandated National coordination
<b>5 Risk allocation and economic incentives</b>	No additional incentives		Develop new longer term incentives	
Security of supply issues	No change	Contractual requirement	Restructure penalties under supply obligation	Develop industry code for supply curtailment
Interconnection incentives	No additional interconnection incentives		Develop specific incentives	
<b>6 Contract template</b>	No standard template	Voluntary templates only	Standard template clauses or bilateral contracts with certain clause requirements	Standard template clauses only
<b>7 Market codes</b>	No additional codes	Process for considering bids	Company specific codes	Industry wide code
<b>8 Value sharing</b>	Existing PR14 incentives	Absolute value return	Cap on return	No cap on return
<b>9 Market structure - system operator</b>	No change		Functional separation	Structural separation

### 5.1.3 Key market design components

In developing the market design options, a number of ‘components’ have been defined to address the specific issues set out in Section 5.1.1. A description of the individual market design components and the issues being addressed is set out Table 11.

**Table 11: Market design components**

Component	Description	Issues being addressed
<b>1. Information database</b>	A managed database for information relevant for assessing the potential opportunities for water trading and put forward ‘bids’ to other companies.	Information asymmetry Uncertainty on the marginal value of water
<b>2. Bid characteristics</b>	The relevant information that needs to be submitted by market participants for potential trades to be considered in the market.	Information asymmetry Non-marginal pricing
<b>3. Assessing bids received</b>	Requirement for companies to consider bids received in their planning and water supply options assessment.	Potential discrimination and market power
<b>4. Bid assessment methodology</b>	An approach on how bids will be assessed by companies and what criteria is used to either accept or reject trading opportunities.	Potential discrimination and market power
<b>5. Risk allocation and economic incentives</b>	Risk allocation and economic incentives to support the case for trading between parties.	Policy and environmental barriers Security of supply, control and reliability
<b>6. Contract template</b>	Examples of contract template clauses that will govern the agreement between parties that choose to enter into a trade.	Security of supply, control and reliability Water quality Potential discrimination and market power
<b>7. Market codes</b>	A set of rules used to underpin the interactions among market participants.	Security of supply, control and reliability Water quality Potential discrimination and market power
<b>8. Value sharing</b>	A mechanism for sharing of the value arising from trades between companies and customers.	Weak incentives to trade
<b>9. Market structure</b>	The types of entities that can participate in the market and whether there are any restrictions on their structure or activities.	Potential discrimination and market power

### 5.1.4 Assessment criteria

Ofwat has developed a set of assessment criteria as part of its Water 2020 programme. These criteria provide a clear analytical framework within which the various design options can be evaluated. It builds on Ofwat’s PR14 design principles and:

- Allows for an assessment of different options on a consistent basis;
- Provides a coherent basis for designing the regulatory framework; and
- Contributes to building trust and confidence by providing a transparent framework on how options are assessed.

Ofwat’s Water 2020 assessment criteria are set out in Table 12 and are made up of three overarching categories, with specific criteria within each category.

**Table 12: Ofwat’s Water 2020 assessment criteria**

Category	Specific criteria
<b>1. How well it helps Ofwat achieve its objectives</b>	<p>Fulfilling our duties through our strategic vision: “to build and maintain trust and confidence”, which means moving to a new model of regulation that:</p> <ul style="list-style-type: none"> <li>• is pro-market;</li> <li>• is outcomes focused;</li> <li>• is relationships focused;</li> <li>• uses a broad range of tools;</li> <li>• is proportionate and targeted;</li> <li>• has effective incentives;</li> <li>• encourages ownership, accountability and innovation;</li> <li>• has flexibility and responsiveness; and</li> <li>• delivers transparency and predictability.</li> </ul>
<b>2. How well it addresses known problems</b>	<p>Current and future challenges:</p> <ul style="list-style-type: none"> <li>• environmental challenges (water quality and scarcity);</li> <li>• maintaining resilience</li> <li>• affordability;</li> <li>• rising environmental standards; and</li> <li>• customer expectations.</li> </ul>
<b>3. How practical is it</b>	<p>Taking into account legal / compliance / regulatory / and other issues, considering:</p> <ul style="list-style-type: none"> <li>• resources required to implement;</li> <li>• the timescales required for implementation; and</li> <li>• the costs of implementation.</li> </ul>

Source: Ofwat

In developing the proposed market option, the above criteria have been taken into account. Further details on how the preferred option relates to each market design component are included in Appendix A.

### 5.1.5 Out of scope market design issues

The following market design issues are outside of the scope of this report and have not been considered in developing the proposed market model.

- **Geographic averaging of retail prices.** It is assumed that water industry will maintain regional averaging of prices at the retail level, although wholesale prices themselves may be de-averaged. This approach is assumed to be driven by non-economic factors, such as political acceptability.
- **Upstream-only licences.** Changes to upstream-only licences and changes to incentives for buyers/sellers that are already being enacted through PR14 are policy changes that have already been determined and therefore are not considered further.
- **Abstraction reform.** Abstraction reforms are likely to have an impact on water trading. However, the magnitude of the impact is unknown, as the proposed reforms have not been finalised yet. The impact could be either positive or negative: if abstraction licence prices reflected water scarcity more sharply, this could increase incentives to trade. However, if trading in abstraction licences themselves increased as a result of the reforms, water companies may focus increasingly on this type of trading and less on physical water trading.<sup>34</sup> Since abstraction reform impacts are currently unknown, yet might be material, the proposed market design has been developed based on the current abstraction regime, but in a way that is expected to continue to support water trading under a range of possible abstraction reforms.
- **Property rights.** Clearly defined and tradeable property rights are a pre-requisite for any market, for example for water markets in Australia. However, rights for physical water resources currently do not appear to be contentious in the England and Wales context (although they could be more relevant for the abstraction reform) and therefore are not considered here.

There is wider regulatory framework being developed that could interact with water trading. For example, a future regulatory framework may include setting additional separate price limits for wholesale activities. This could include having a separate price control for water resources, which would include owning the abstraction rights. A number of other activities beyond the procurement of water could also be included in the water resources price limit, such as water storage and operation of assets used to abstract water from boreholes and water courses.

It may be more appropriate to have a separate price control for water resources in the event that structural separation of upstream activities is the preferred option for developing markets and for addressing issues such as potential market power by incumbents. This would also be consistent with the direction taken in PR14 to have separate binding price controls for wholesale and retail. However, it is not clear what impact a separate price control would have on the potential effectiveness and functioning of a water trading market in isolation. Therefore, this issue will need to be revisited as the market and other reforms develop.

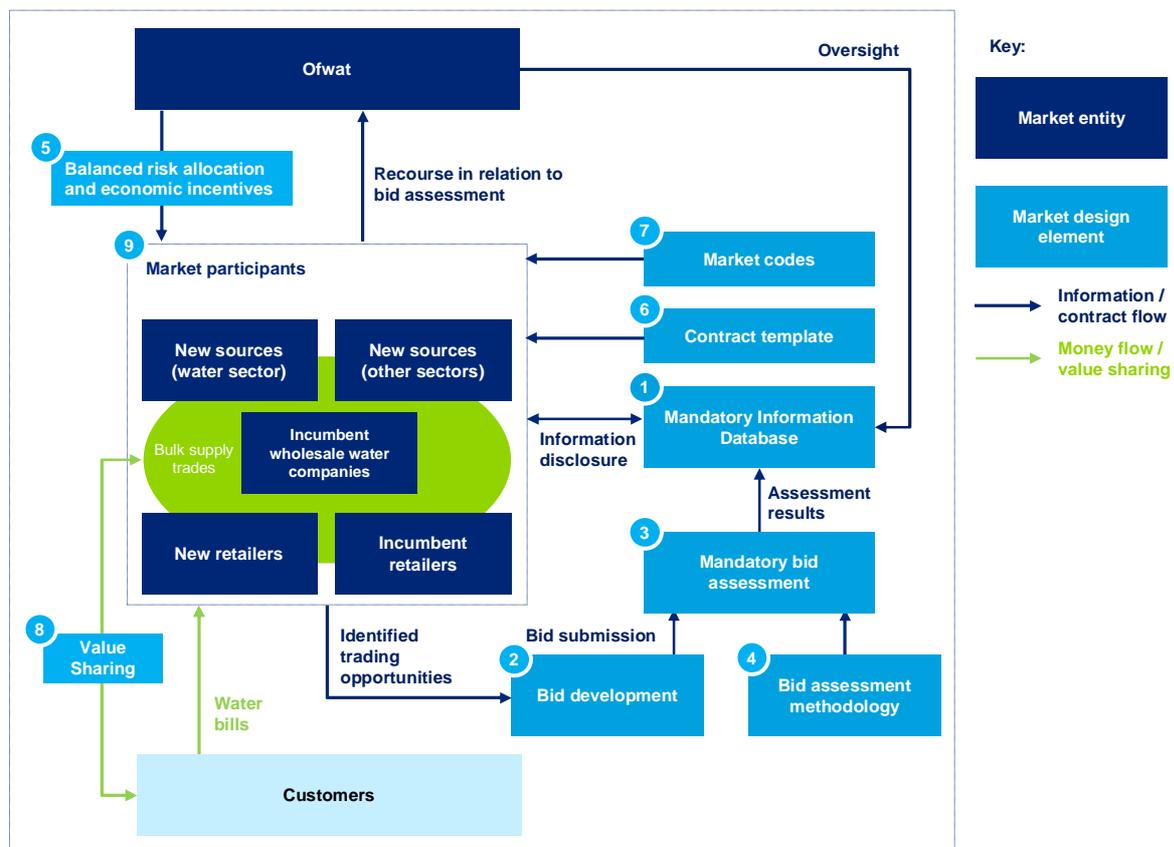
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<sup>34</sup> The distinction between physical and rights trading is relevant in the context of the report. However, both types of trading can help the industry achieve its objectives of cost efficiency and system resilience.

## 5.2 Proposed market model

Based on the range of options for each market design component described in Section 5.1.2, this section outlines a proposed water market model to be considered for further industry consultation. An outline of the model is shown in Figure 9 and described in more detail in the following pages.

**Figure 9: Proposed market model**



Source: Deloitte analysis

The proposed market model is expected to promote both water trading among existing market participants as well as potentially enable new entry to take place. However, the structure of the proposed model is intended to cater for both types of opportunities.



### 1. Mandatory Information Database

The information database would be under the custody of a central entity which would need to be an independent third party and not a market participant. Initially the entity could be part of Ofwat and governed in a way similar to the regulator, but the entity could become an independent third party in the future. The entity would have responsibility for ensuring the security and confidentiality of the

information, and the running costs would be recovered through an annual charge on market participants, or through the price control review process. Further detail on the role of the central entity can be found in Box 5.

Submission of information would be mandatory for wholesalers, but other participants may contribute information to the database on a voluntary basis. The type of data would include cost and technical data, as well as supply and demand projections for individual companies, all in a standardised format, to facilitate the identification of water trading opportunities in England and Wales.

Where possible, the content, format and type of information would be aligned to work already undertaken by companies as part of the WRMP process. Participants would be expected to review and confirm the suitability of the information included in the database on an annual basis.

Companies would need to provide an appropriate level of assurance on the quality and reliability of the data submitted to the database. Access to the database would be restricted to those parties that have qualified as market participants via a specified set of criteria. By qualifying as market participants, all the parties, including new entrants, would be required to contribute to the running costs of the database, as set out above.

The Mandatory Information Database is a pro-market tool that encourages transparency and predictability in the market. By supporting the identification of potential trading opportunities, it aims to address the problems of resilience, affordability and environmental sustainability. The implementation builds on existing tools and data collection processes and imposes limited costs on the industry, provided that the commercial sensitivity of data is adequately protected.

#### **Box 5: Mandatory Information Database: central entity**

The role of the central entity in relation to the Mandatory Information Database can be summarised as follows:

- **Role.** The central entity would act as the custodian of market participants' information related to water trading. The entity would be run by an independent third party (initially this could be part of Ofwat) and would not be a market participant.
- **Information disclosure.** The information to be disclosed in the database would be standardised across all market participants.
- **Security.** The central entity would develop suitable security mechanisms to protect the information under its custody.
- **Intellectual Property.** The information would remain companies' Intellectual Property, but they would need to grant a licence for the central entity to manage, maintain and disseminate the information.
- **Access.** The central entity would provide access to the information to qualified market participants only.
- **Frequency of updates.** Companies would disclose information to the central entity on an annual basis and this would build on existing WRMP tools where possible.
- **Costs.** The costs of the central entity would be recovered through licence fees from incumbent water companies.
- **Bid information.** Companies would provide the outcome of bids assessed to the central entity and this information would be available through the Mandatory Information Database.



## 2. Bid Characteristics

Each bid would need to satisfy a minimum set of criteria, set by the regulator, in terms of the information being submitted, including the use of long run marginal costs (“LRMC”) for the cost-benefit analysis. The type of information that would need to be submitted would include among other things:

- technical description of the scheme;
- source and quality of water;
- reliability and costing information;
- environmental impacts of the scheme; and
- assessment of security of supply issues.

The approach to defining bid characteristics is focused on achieving a high degree of comparability across companies and is proportionate to the challenge of information asymmetry. By supporting the assessment of potential trading opportunities, it seeks to address the problems of resilience, affordability and environmental sustainability. The development of the rules can be relatively quick, and it would enable both bidders and incumbents to implement a transparent assessment approach to individual bids.



## 3. Assessing Bids Received

Wholesalers,<sup>35</sup> as recipients of bids, would be obligated to assess each bid submitted to them, and this would be incentivised by a price control penalty/reward mechanism. The mechanism would seek to reward/penalise companies in proportion to the bids assessed, but the strength of the rewards/penalties would need to be calibrated appropriately.

Companies would be required to assess bids as and when received. In the event that this was leading to an inefficient process by incumbent companies, then an alternative option would be to have specific windows where bids could be received and assessed by companies. However, these windows would need to take place on an annual basis.

The outcome of the assessment (acceptance or rejection of a bid) would need to be added to the information database so that other market participants could see the outcome of previous bids submitted.

While the process for the bid assessment would be separate from the WRMP, companies would be expected to make use of the tools already at their disposal for the development and annual reviews of their WRMPs.

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<sup>35</sup> Retailers would not be formally required to consider any such bids, since they are assumed to have strong incentives to find and evaluate the most cost-effective sources of water independently of any market design reforms.

This approach is a pro-market and proportionate tool that encourages ownership and innovation among companies. It encourages companies to explicitly consider the current and future supply challenges. This is an appropriate approach on the basis that the number of bids received by each company in a given year may be limited in the early stages of the market development, therefore the costs are not disproportionate.

Ofwat does not have powers over non-undertakers to mandate third party participation and/or to mandate the use of specified bid characteristics. The implementation may therefore rely on cooperation and reputation impact to ensure that third parties participate as intended.



#### **4. Bid Assessment Methodology**

The methodology used by companies to assess individual bids would be a short principles-based guidance, developed through the engagement with industry stakeholders. This provides companies with flexibility to consider a range of bids and to innovate, without being constrained to a particular assessment format which may not be appropriate. For transparency, companies may wish to publish how they would assess bids received, but this would not be mandatory. The types of principles for the methodology to assess bids includes being:

- Transparent;
- Comprehensive (capturing widest possible range of circumstances);
- Non-discriminatory;
- Internally consistent; and
- Aligned to the potential recourse process.

Recourse to Ofwat would be available to companies in the event of disagreement on the outcome of the assessment process. This is required in order to provide particularly smaller players with an assurance that their bids will be assessed in good faith. The specific mechanism for the recourse process would need to be determined in consultation with Ofwat's legal team. However, if this does not turn out to be legally viable, Ofwat may not be able to provide the required recourse, particularly in relation to third party non-undertakers, and alternative mechanisms may need to be explored with legal advisers.

At this stage, companies would not be required to consider the national impact of specific schemes they are assessing.

A principles-based bid assessment methodology is flexible and responsive to the evolving nature of the market and encourages companies to focus on the optimal outcomes for their customers. The principles underpinning the methodology need to be designed to reflect the challenges to the resilience, affordability and environmental sustainability. A principles-based assessment methodology strikes a balance between an arbitrary bid assessment and a complex rules-based methodology, which would not provide sufficient flexibility.



## 5. Risk allocation and economic incentives

Ofwat would enact a number of changes to overcome the security of supply barrier to trading. Initially, this could be done through a combination of measures including:

- Develop clearer and non-discriminatory rules for supply curtailment (and/or for sharing non-delivery by a particular water source), particularly where this affects cross-border supply. For example, through contract template clauses to be included in contracts that allows buyers and sellers to 'share' any shortfalls in source delivery in an agreed and proportionate manner.
- Clarification by Ofwat on the status of the SOSI in PR14 and beyond, particularly for those companies that have not developed their own commitments on security of supply. This would aim to avoid potential misunderstanding between the regulator and the companies;
- Encourage smarter contracting (e.g. tiered financing) and hedging, for example through the publication of case studies and/or worked examples;

In addition, Ofwat would review the existing economic incentives for PR14 and explore options for improving longer-term incentives for investment. However, these would not include explicit financial incentives for interconnection.

The design of the incentives would aim to balance the risk and reward incentives for companies and minimise the impact of any reforms on the companies' cost of capital.

This approach is focused on delivering key outcomes through the use of effective incentives. It aims to strike a balance between the affordability of customer bills, relative to the system resilience and environmental sustainability. By building on the existing incentive structures, it is relatively straightforward to implement.



## 6. Contract template

The working assumption is that market participants would continue to contract bilaterally under their own terms. Under such a model, a contract template could be developed to support water trading. This would help more parties to enter into potential contractual arrangements and would provide information to new entrants on the types of clauses that need to be considered. The contract template would cover a wide range of issues, focusing on 'common practice' to help new entrants understand the market.

The contract template would include standard clauses that provide a proposed option that can be used by parties or as a starting point for further negotiations. It should be noted that the contract template is not intended to influence or guide the value-sharing negotiation process between buyers and sellers.

Availability of contract templates has the potential to reduce transaction costs for market participants and provide a level playing field from the perspective of new entrants. Contract clauses relating to the security of supply help addressing the problems of system resilience and affordability. The non-mandatory approach provides companies the freedom to use the contract template if it is helpful, but does not impose an unnecessary compliance burden.



## 7. Market codes

As part of the PR14 water trading incentives, companies need to develop their own Trading and Procurement codes to qualify for the incentives. These codes need to be approved by Ofwat and must include a specific set of principles defined by Ofwat as part of the PR14 final methodology.<sup>36</sup>

Given this existing requirement, together with the proposed contract template clauses and recourse to Ofwat for participants that have bids rejected, the proposed marked model does not include an additional market code as a requirement for participants. However, the current codes may need to be updated in order to define the new role of the Mandatory Information Database entity and to enable incumbent wholesalers to dispatch third party resources.

This design option would be kept under review as the market develops. If deemed necessary, an industry wide code for water trading could be developed at a later stage. An industry wide code would be more complex, but would provide a consistent basis for market participants to engage across England and Wales. The industry wide market codes would cover a range of specific issues including contract duration, volumes, cost and price, quality, non-delivery provisions and sharing of resources in the event of system stress. A clear governance process for code management would be required.

The experience from retail water markets and other sectors indicates that the development of new market codes can be a complex and time consuming exercise. By building on the existing PR14 approach, and relying on contractual solutions to trading challenges, such costs of developing market codes are avoided. This seems proportionate to the scale of the opportunity.



## 8. Value sharing

Ofwat could consider amending the existing economic incentives for trading, and balance those against the extent to which customers also benefit. The proposed market might need to include a cap on returns such that the benefits derived from trading can be shared between companies and customers. The extent to which value is shared with customers may potentially limit incentives for companies to trade. For example, it may be appropriate to start with more generous incentives to trade, in order to establish a culture of trading, and these incentives would then be progressively reduced over time.

There may be challenges for Ofwat to demonstrate a credible long-term regulatory commitment, but examples from other industries have been encouraging.

A suitable value sharing mechanism supports market development by providing adequate incentives for trading. The value-sharing mechanism aims to strike a balance between the status quo (limited incentives for companies to trade), and an uncapped return on investment, which could result in excessive returns to some companies, and limited sharing of the benefits from trading with customers. The mechanism can be implemented in relatively straightforward manner by adapting existing regulatory framework.

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<sup>36</sup> Appendix 3: Trading and procurement codes – requirements and advice on principles to be included, Ofwat, July 2013



## 9. Market structure

The existing market structure would remain in place, with limited intentions to restructure (including functional separation of market operators). System coordination and non-discrimination of smaller players would be supported by the industry code and other rules already in place.

The existing market structure already provides the framework that is pro-market and outcomes focused. Changes to market structure would be a costly, complex and disproportionate solution to the challenges of water trading. Unbundling of upstream water licences appears to be a sufficient initial step in developing water market in England and Wales.

## 5.3 Implementation steps

The elements of the proposed market model may be implemented in a staged process. Some of the elements, such as the Mandatory Information Database have the potential to be implemented ahead of the rest. This approach has the advantage of progressively introducing market elements into the water sector and enable market participants to gradually adjust to the new environment.

The first step in implementing market design is to determine the role of relevant regulators in the process. This may include the elements listed below, but there may also be additional steps required, as the implementation plan is developed in further detail:

- Setting out Ofwat's role in developing the PR19 process;
- Coordination between Ofwat and Defra in relation to proposed abstraction reforms, their timing and the impact on the water market;
- Engaging with the EA on potential changes to the licence allocation regime; and
- Engaging with DWI in relation to the regulations on water quality and coordinating the changes required (if any) to support water trading.

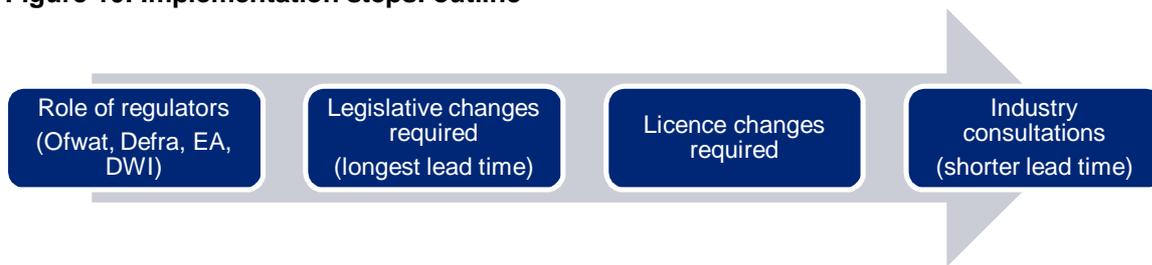
The second step is to consult with Ofwat's internal legal team, other regulators' legal teams, and potentially external advisers on the legal feasibility of the detailed market design arrangements, once these have been set out by Ofwat. If there are any legislative changes required, for example in relation to setting up the Mandatory Information Database, these are likely to have the longest lead time, so need to be initiated as soon as possible.

The third step, related to the legislative changes, involves potential licence changes to appointed companies. Such licence modifications may relate to the obligation to provide information to the Mandatory Information Database. However, these are expected to be relatively limited.

Finally, there is likely to be a number of industry consultations required to support the detailed design of the market. These are likely to include:

- A review of the totex and trading incentives, and options for developing the system further, including through changes to the incentives (for example longer-term retention of economic profits);
- Strength of reward/penalty mechanisms required to support the market design components, including the mandatory bid assessment;
- Modifications to the existing industry codes to determine the role of the Mandatory Information Database entity; and
- Development of the principle-based methodology for bid assessment.

The steps for market design implementation are summarised in Figure 10.

**Figure 10: Implementation steps: outline**

More broadly, the key issues in relation to the implementation of a water market include:

### **Implementation costs**

Many of the more intrusive market design options involve significant implementation costs. It may be appropriate to avoid and/or minimise such costs when the market is initially being created, before it is known whether these costs are justifiable in relation to the overall size of the market.

Some examples of implementation costs that can be initially avoided include those related to industry restructuring and setting up market exchanges. However, some implementation costs cannot be avoided, such as the development of the Mandatory Information Database.

### **Transaction costs**

Many of the market design options are explicitly aimed at minimising transaction costs for market participants. This encourages both existing and new companies to explore new opportunities and effectively exploits the economies of scale (e.g. of developing a contract template) at the scale of the industry as a whole.

### **Progressive learning**

Some of the design options can be developed with 'lessons to be learnt' in mind, to enable experience from the initial implementation to be used to refine the design further. Piloting of specific market features may be appropriate in some cases. For example, water companies may wish to consider developing a regional pilot in the South East of England, given that the majority of potential trading opportunities identified through Ofwat modelling are located there.

## Appendix A Market design issues

This Appendix provides further detail on key market design issues as set out in Section 5 and evaluates each market design component against Ofwat's Water 2020 assessment criteria.

For each of the nine components set out in Section 5.1.1, the following is described:

- The problem or problems being addressed through the design of a particular element;
- Relevant issues for the design of the element;
- The options considered for the specific component. The recommendation for each component is summarised at the top of each section, in bold. The preferred option was selected on the basis of Ofwat's Water 2020 assessment criteria. The design has sought to recommend options that are light-touch, targeted, lower-cost, effective and proportionate to support water trading;
- Ofwat Water 2020 assessment criteria summary; and
- Practical challenges for the market design. For each of the practical challenges, the report first sets out the recommendation on the preferred option, in bold, and then goes on to summarise the analysis of the option below. This includes the range of options considered and rationale for discarding those options that have not been selected.

Where relevant, examples and parallels from other industries from which lessons can be learned are also included.



## 1. Mandatory Information Database

### Problem being addressed

Information asymmetry among market participants and lack of accessible, reliable and comparable information to evaluate potential trading opportunities appear to create barriers to trading for some market players. This relates to two specific aspects:

- **Frequency of information being published.** The information currently published by companies through the WRMP is only updated every five years, and therefore may not be sufficiently up-to-date and/or relevant for the assessment of trading.
- **Scope of information.** Companies already develop significant levels of information when preparing WRMPs, but some of the information is not disclosed publicly, for example the underlying data tables. The reports themselves do not provide the data in an accessible way for complex quantitative analysis to be carried out (databases).<sup>37</sup> Some stakeholders, although not all of them, have considered them unwieldy, not sufficiently granular and/or not sufficiently accessible.

### Relevant issues

- Market participants need sufficiently detailed and comparable information in order to be able to formulate credible and competitive proposals for the development of new interconnections / new sources of water.
- Access to standardised information database develops a level playing field among participants and reduces the 'search' costs. These have not been quantified as part of the study, but are assumed to be sufficiently significant to act as a deterrent, based on the fact that a number of stakeholders have perceived the information asymmetry to be a barrier to trading.
- Regional initiatives have been developed that enable water companies to share the data underpinning WRMPs, mostly in the South and South East of England. This suggests that companies may be willing to share information with other parties, provided that the framework is designed appropriately.

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<sup>37</sup> Some information is withheld due to national security considerations. The range information to be disclosed in the Mandatory Information Database needs to continue observing such restrictions.

## Options considered

Level of intervention	Low	High
<b>Component</b>		
<b>1 Information database</b>		Companies hold information
Level of participation	Voluntary	Mandatory for licensees only
Type of information	For companies to decide	Agreed set of standard data
Level of access	Free access to all information	Different depending on type of information
Frequency of updating information	As and when changes occur	Every 5 years (in line with WRMP)

## Proposed market design component

The proposed solution is to require companies to share standardised information on a common platform such as an Information Database. This can improve the information quality and transparency and facilitate trading. By requiring companies to update the information on an annual basis, the information available to market participants would be timely and relevant at the time of evaluating potential trading opportunities.

## Ofwat Water 2020 Assessment criteria

The Mandatory Information Database is a pro-market tool that encourages transparency and predictability in the market. By supporting the identification of potential trading opportunities, it addresses the problems of resilience, affordability and environmental sustainability. The implementation builds on existing tools and data collection processes and imposes limited costs on the industry, provided that the commercial sensitivity of data is adequately protected.

## Consideration of design options

1.1 <b>Information database</b> <sup>38</sup>	<p><b>Database to be run by an independent third party who is not a market participant.</b></p> <p>The information can be either collected by a central entity, or individual companies could retain ownership of the information. In the latter case, companies would need to have an obligation to disclose the information to third parties subject to pre-defined rules.</p> <p>Options considered:</p> <ul style="list-style-type: none"> <li>• The status quo option (of no information database) does not address the</li> </ul>
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<sup>38</sup> An alternative to the Mandatory Information Database could be the creation of a national water resource optimisation model, similar in principle to the WRSE group. Such an approach would involve mandating companies to examine trading opportunities identified through the national model as part of the WRMPs.

However, this approach appears to be disproportionate in addressing the issue of water trading at this stage, and it goes against Ofwat's aim to ensure companies take ownership of their long-term water management planning.

**Consideration of design options**

problem of information asymmetry identified above.

- The option where companies retain the information does not necessarily deliver a level playing field among market participants, since companies may have an incentive to delay the disclosure process (and demonstrating that delays have been intentional would be costly and/or challenging to enforce by the regulator). Having multiple companies holding information would also increase the transaction costs of assessing potential trading opportunities. This is therefore not a preferred option.
- The option where a central entity holds the information appears to be most appropriate, as there would be a single source for the information that existing or prospective market participants could access. However, separate set-up and ongoing costs would be incurred and these would need to be recovered through licence fees.

**Participation and submission of information to be mandatory for all licenced wholesalers.**

- All licenced wholesalers are required to submit information to the database, including, in the future, holders of the wholesale licence only. This may require a change to the licence conditions to be implemented, and this would need to be agreed with companies.
- New entrants must disclose information on proposed schemes as part of the bidding process. This could be implemented by clarifying that companies are only obligated to evaluate bids in case the bidder has agreed for the information to be published. To ensure that this does not act as a barrier to entry, this condition needs to be formulated in a way that takes into account potential commercial interest challenges and risks.
- New entrants may also acquire additional obligations (again, through their licence conditions) to provide information to the database if they are successful in the bidding process and become wholesalers.

**1.2 Level of Participation**

Options considered:

- Voluntary information disclosure is not sufficient to ensure that all potential trading counterparties have access to a comprehensive dataset that enables them to formulate potential trading options.
- Mandating participation for all market participants does not seem enforceable and/or practical, since market participants can include players from outside of the water industry (for example agriculture). The jurisdiction of water industry regulators does not, by definition, extend to

### Consideration of design options

such third parties. In particular:

- Retailers to participate on a voluntary basis (e.g. with demand management schemes). The wholesale water market may be of interest to some retailers, but not to all of them.
- Owners of alternative water supply sources (for example from other sectors) to participate on a voluntary basis. It is impractical and excessively costly to identify all potential market participants from across agricultural, power and industry sectors.
- Mandatory participation by licenced wholesalers is the preferred option, as it effectively addresses the problem of information asymmetry, and is practicable in terms of implementation.

#### **Information disclosed in the database to be standardised across all market participants.**

Options considered:

The type of information to be collected in the database could either be determined by companies, or it could be standardised:

- A non-standardised information database, where companies individually decide on the information to be published, would fail to address the problems of information asymmetry and transaction costs, since the users of the database would continue facing a set of data that is not reported on a consistent basis, and may not cover sufficient levels of detail.
- Standardised information database is more appropriate as a tool for addressing the information asymmetry.

#### 1.3 Type of information disclosed

In terms of the practical implementation, the range of information to be collected in the database may need to strike a balance between:

- Being sufficiently comprehensive to enable parties to identify and evaluate potential trading opportunities, including through new interconnections;
- Not being excessively detailed so as to impose excessive costs on the companies in terms of collecting and submitting the information.

Specific elements contained in the database could include:

- Long-term supply and demand forecasts at individual WRZ level;<sup>39</sup>

<sup>39</sup> This information may help companies to develop new water sources specifically for the purpose of water trading. This would be the case if the information on companies' demand and supply projections could be used by other parties in developing the 'justification of need' argument required to obtain the EA licence.

<b>Consideration of design options</b>	
	<ul style="list-style-type: none"> <li>Location, volumes and marginal costs of developing new sources; and</li> <li>Quality information on individual water sources, including flow rate, reliability and chemical composition.</li> </ul> <p>Some companies may consider that disclosing too much information may put them at a commercial disadvantage when negotiating trading agreements with third parties. The scope of information to be disclosed needs to balance the need for information transparency with the asymmetric bargaining power that it may lead to.</p>
<b>1.4 Level of access</b>	<p><b>Access to the information provided to qualified market participants only.</b></p> <p>Options considered:</p> <ul style="list-style-type: none"> <li>An ‘open-source’ database, where free access is provided to the information in the database, is unlikely to be acceptable for a number of companies, given that it may contain sensitive cost information. Instead, a more acceptable design would involve making sure that access to the database is subject to Terms and Conditions that limit further disclosure and that access is monitored on an ongoing basis.</li> <li>Providing access to qualified market participants only is the preferred option, since this would mitigate the confidentiality / commercial sensitivity concerns (relative to the ‘open-source’ option), but still provide the necessary information to all actual and potential market participants. This would require that appropriate ‘qualification criteria’ be developed to identify market participants. For example, existing wholesalers may all be allowed by access the information, but more refined criteria would need to be developed for new entrants.</li> <li>The intermediate approach, where different types of information are accessible to different market participants, would be confusing, more difficult to implement, monitor and enforce, increasing the costs to the industry. There are no significant benefits in implementing this variant as compared to the option where access to the same information is provided to all qualified market participants.</li> </ul>
<b>1.5 Frequency of updating information</b>	<p><b>Information to be disclosed on an annual basis, but build on existing WRMP tools where possible.</b></p> <p>Options considered:</p> <p>Incumbent companies may be required to submit information to the information database every five years (in line with the WRMP process), every year to reflect annual updates, or on an ongoing basis.</p> <ul style="list-style-type: none"> <li>Updating the information every five years is not sufficient, since the</li> </ul>

Consideration of design options

information is often not up to date and cannot be used for decision-making purposes;

- Ongoing publication is not a practical solution, since it increases the costs both for market participants and the central entity. It would also create a degree of inconsistency among market participants – as the database would contain information from different points in time for different companies, which would then not necessarily be comparable.
- Regular annual updates are the preferred option, since they ensure the information is sufficiently up to date, while maintaining consistency and comparability among companies, and without imposing excessive costs on the industry.

Other considerations:

- New entrants (including new wholesalers from the water industry and other sectors and water sources) may be required to submit information at the point of putting forward a bid. Once they have acquired a wholesale licence, they should submit information in the same way as incumbent companies. It seems unlikely that this would create a perverse incentive for new entrants to create a new company every time they wish to build a new resource, due to the transaction costs involved and due to the fact that as wholesale licence holders, they would not be able to avoid information disclosure requirements.
- All companies may be required to submit information on all bids they have assessed when the assessment decision is published (see below on the frequency of the bidding process).

Practical challenges

1.6 Costs

**Costs to be recovered through licence fees from incumbent water companies.**

There are two sets of costs associated with the information database:

- Information development and collection, incurred mostly by existing companies. The additional costs of submitting the information to the central entity are not expected to be excessive, since the information is developed for the WRMPs every five years and updated annually.
- Maintaining the database, ensuring security of the data and disclosure the information to appropriate parties. These costs need to be recovered.

The costs associated with the development and maintenance of the information database have not been quantified as part of this report.

<b>Practical challenges</b>	
	<p>Options considered:</p> <ul style="list-style-type: none"> <li>• Cost recovery through access fees to the database is not possible if the central entity that maintains the database is part of Ofwat.</li> <li>• Cost recovery through qualified market participants would act as a barrier to entry to new participants who would wish to have access to the information. This is not appropriate for a market design that aims to overcome barriers to new entry.</li> <li>• Cost recovery through the licence fees may therefore be the most practical solution that does not increase barriers to trading.</li> </ul>
<b>1.7 Security and Confidentiality</b>	<p><b>The central entity that runs the information database to develop suitable security mechanisms to protect the information under its custody.</b></p> <p><b>Information to remain as companies’ Intellectual Property, but they would need to grant a licence for the central entity to manage, maintain and disseminate the information.</b></p> <p>Companies would share the information with a central entity, who would act as a custodian of the information, to keep it secure and manage access. If Ofwat, or Ofwat’s subsidiary acted as the central entity responsible for the information database, the regulator would need to be comfortable with the additional responsibilities, and potentially have its statutory duties amended.</p> <p>The disclosure to the central entity would need to be under terms and conditions that allow for disclosure to third parties, potentially under a set of rules that enable the central entity to maintain a degree of control, but without acting as a barrier to entry.</p>
<b>1.8 Competition issues</b>	<p><b>The database to be designed in a way that does not create risks of anti-competitive behaviour.</b></p> <ul style="list-style-type: none"> <li>• <b>Tacit collusion.</b> There is a concern that sharing information among incumbents and new entrants creates a platform that might provide conditions conducive to tacit collusion. For example, incumbents might agree to reject all bids from new entrants below a certain price level. In practice, this is unlikely to work since the information on companies’ marginal costs as well as the bids will be publicly available.</li> <li>• <b>Market-sharing.</b> New entrants might use information on incumbents’ marginal costs to agree not to compete on price and to instead share the market geographically. In practice, this is unlikely to work since the new entrants are geographically linked to specific sources of water. If there are multiple potential new entrants in a given area, they will find it challenging to share the market in geographical terms.</li> </ul>

### Practical challenges

Both types of anti-competitive behaviour can be successfully mitigated through information disclosure rules that enable public scrutiny of companies' decisions and through recourse options available to companies (see further below).



**2. Bid Characteristics**

**Problem being addressed**

The purpose of trading is to identify the economically most efficient options for delivering water. However, the current regime may not be successful in achieving such efficiency. There are two aspects to this:

- Whether the assessment is carried out on the basis of the long-run marginal costs (as opposed to average costs); and
- Whether the costs considered by market participants, when putting together a bid are consistently defined, such that there is comparability across bids.

**Relevant issues**

- Marginal prices provide better information on water’s relative scarcity value and their use supports better investment decisions (Ofwat 2011). As set out in the main body of the report, in the past, many potential opportunities to trade have been assessed on the basis of average, rather than marginal, water supply costs (see Section 4.1.2).
- This has failed to identify all of the potentially economically attractive schemes, since the expected benefits from trading, when evaluated on the basis of an average cost, are lower than those evaluated on the basis of marginal cost of new water sources (in simple terms, this is because the cheapest sources, which feature in the average cost calculation, have already been developed, while the more expensive ones are yet to be developed – these are the marginal ones).
- Calculation of Average Incremental Social Costs (“AISC”) is complex and data-intensive, particularly if full costs (including environmental and security of supply) are to be taken into account.

**Options considered**

Level of intervention	Low	High
Component	←—————→	
<b>2 Bid characteristics</b>	No standards defined	Minimum criteria Defined template
Access Pricing reforms	Proceed ahead of reforms	Implement alongside reforms Implement after reforms

**Proposed market design component**

The proposed solution is to set out minimum criteria that each potential bid must satisfy, such that there is a degree of comparability across companies. The minimum criteria are to include the use of LRMC as part of the assessment.

**Ofwat Water 2020 Assessment criteria**

The approach to defining bid characteristics is focused on achieving a high degree of comparability across companies and is proportionate to the challenge of information asymmetry. By supporting the assessment of potential trading opportunities, it addresses the problems of resilience, affordability and environmental sustainability. The development of the rules can be relatively quick, and it would enable both bidders and incumbents to implement a transparent assessment approach to individual bids.

<b>Consideration of design options</b>	
<b>1.9 Bid characteristics definition</b>	<p><b>Minimum set of criteria to be defined for bids to be submitted, including use of Long Run Marginal Cost (“LRMC”).</b></p> <p>If bid assessment were mandatory for some of the market participants, it would be necessary to precisely define what a ‘bid’ means (see below for further information on the bidding process arrangements).</p> <p>A definition, including minimum set of criteria in terms of the information being submitted in the bid, will provide bidders with the certainty that they know what is expected of them when submitting a bid. If well defined, it also provides companies with sufficient information that is required to be able to carry out a meaningful assessment of the option.</p> <p>The type of information required for a bid may include: source of water, technical description of the scheme, water quality, reliability and costs (including, on a mandatory basis, the LRMC), environmental impacts of the scheme and impacts on the security of supply.</p> <p>Options considered:</p> <ul style="list-style-type: none"> <li>• No standards defined. This is not an appropriate option, since there would not be sufficient comparability across potential bids (for example, if multiple bids were submitted to a single incumbent) for the recipient to be able to evaluate them adequately.</li> <li>• Minimum criteria. This is the preferred option, as the minimum set of criteria would ensure that companies are not required to assess poor quality trading options submitted by third parties (otherwise incumbent companies would be incurring additional costs in relation to the assessment of low quality or incomplete bids).</li> <li>• Defined template. This is not an appropriate option because it would be complex and costly to develop a single template that was suitable for all possible circumstances.</li> </ul>
<b>1.10 Access pricing</b>	<p><b>Water trading does not need to wait for access pricing reforms.</b></p> <p>Access pricing that moves away from the cost-principle can provide stronger economic incentives for new entry and limits the extent to which network owners can discriminate against third parties (Ofwat 2011).</p>

### Consideration of design options

However, access pricing reform is complex and may take a relatively long time to develop and for access prices to be determined.

Options considered:

- Water trading to proceed ahead of reforms.
- Water trading implementation to wait, either until access pricing starts being implemented, or after it has been completed.

Existing literature provides a mixed view on whether access pricing regime is a necessary pre-requisite for water trading (SVT & EY 2011, Stern 2010).

On balance, it appears that water trading may be able to start under the current access pricing regime, although the potential for trading may improve once the reform has been completed.



**3. Assessing Bids Received**

**Problem being addressed**

The observed levels of water trading have been relatively low. As suggested in Section 2, it seems likely that companies may not yet have exhausted all the possible opportunities for water trading. Companies may not be fully identifying and/or considering all the potential options for water trading, which could be driven by cultural and/or market power issues.

**Relevant issues**

- Mandating specific volumes of trading (including as a share of total volume supplied) (Stern 2010) is likely to be inefficient and to impose excessive information costs on the regulator to identify the right levels to mandate.
- Trading is not an objective in itself, but is a tool that helps uncover information about the value of water and incentivise changes in behaviour in terms of efficiency and innovation.
- The impact of totex and trading incentives from PR14 is unclear at this stage. A review, to be carried out at an appropriate point in time in the future, may help defining the scope for further incentives.
- Some stakeholders have indicated that the development of trading opportunities has been limited by lack of interest and/or information from third parties.

**Options considered**

Level of intervention	Low ←————→ High			
Component				
3 Assessing bids received	No additional requirements	Mandatory, with reputational incentive	Mandatory, with rewards/penalties	
Frequency	Every five years (in line with WRMP)	Annual window	Ongoing	
Disclosure of bids	None	Voluntary	Mandatory via information database	Mandatory via annual reports

**Proposed market design component**

The proposed solution is to make the assessment of all potential bids received by third parties mandatory. This is intended to incentivise companies to look more closely at a wider range of opportunities to trade water, and to prevent any potential discrimination and/or exercise of market power (whether actual or perceived).

**Ofwat Water 2020 Assessment criteria**

This approach is a pro-market and proportionate tool that encourages ownership and innovation among companies. It encourages companies to explicitly consider the current and future supply challenges. This is an appropriate approach on the basis that the number of bids received by each

company in a given year may be limited in the early stages of the market development, therefore the costs are not disproportionate.

### Consideration of design options

<p>1.11 <b>Process for mandating</b></p>	<p><b>Incumbent water companies required to assess all bids submitted to them, incentivised by a price control penalty/reward mechanism.</b></p> <p>Incumbent companies may need to be required to assess all bids that are submitted to them, subject to the minimum quality criteria defined above.</p> <p>Options considered:</p> <ul style="list-style-type: none"> <li>• <b>No additional requirements.</b> This is not a preferred option since the status quo incentives for companies may be perceived as providing opportunities for discrimination against smaller players (although this is not intended to suggest that such discrimination is actually taking place).</li> <li>• <b>Reputational incentives.</b> Similarly to the option above, this is not a preferred option, since reputational incentives are unlikely to be strong enough to motivate companies to significantly alter their current behaviour.</li> <li>• <b>Reward/penalty incentives.</b> This is the preferred option, as companies would be incentivised to carry out the bid assessment and the process would be implemented through the regulatory framework through a set of PR rewards / penalties. The strength of these penalties may need to be determined by Ofwat, in consultation with the industry.</li> </ul>
<p>1.12 <b>Frequency</b></p>	<p><b>Bid assessments to be carried out on an ongoing basis.</b></p> <p>The frequency with which companies are required to assess the individual bids can range from every five years (in line with the WRMP), to a continuous ‘assess as bid’ arrangement, where companies would have an obligation to respond to each bid within a pre-defined timeframe.</p> <p>The trade-off is between the costs that are being imposed on companies, relative to the relevance and timeliness of potential bids, and their usefulness in providing ‘advance signalling’ of potential opportunities to other market participants.</p> <p>Options considered:</p> <ul style="list-style-type: none"> <li>• <b>A five-year assessment period</b> could be aligned with the existing WRMP processes, and this would be relatively straightforward from the companies’ perspective (SVT &amp; EY 2011). However, it creates long interim periods during which the water market is virtually non-existent and therefore is not the preferred option.</li> <li>• <b>A regular assessment</b> (every year, or every couple of years) has the benefit of focussing companies’ and new entrants’ minds on specific deadlines for bid submission, and enables incumbent companies to</li> </ul>

## Consideration of design options

prepare and plan for busy assessment periods. However, it may still create unnecessary delays to the assessment of potential opportunities, and therefore is not the preferred option.

- **An ‘ongoing’ assessment**, where companies are required to respond to any bid within say 90 (or another number of) days, has the advantage of continuously providing the most up to date information, but it may be perceived as too onerous by companies. This is currently the preferred option, on the assumption that the number of bids coming forward is relatively low.<sup>40</sup>

### **Companies to provide the outcome of bids assessed to the Information Database.**

Companies may be required to provide the outcome of the bid assessment process (i.e. the acceptance and rejection of a bid) to the Mandatory Information Database.

Options considered:

- **No disclosure and/or voluntary disclosure.** This is not the preferred option since historical acceptance and rejection rates are an important and a highly relevant piece of information from the perspective of new entrants when they prepare their bids. Intentionally withholding such information from market participants limits market transparency.
- **Mandatory disclosure via information database.** This is the preferred option since it would provide visibility to other market participants on previous bids submitted and the resulting outcome.

#### **1.13 Disclosure of accepted and rejected bids**

There is a risk that disclosure could create a risk that in cases where an incumbent company has rejected a large number of bids in the past, new entrants may be discouraged from putting forward new bids (‘vicious circle’). However, two counter-arguments are as follows:

Incumbent companies will realize that their assessment decisions, as well as the underlying justification for those decisions, will be published and scrutinised, particularly if those decisions are consistently negative. This will encourage companies to assess potential bids objectively and will help ensure that only genuinely efficient trades are taken forward;

A ‘virtuous circle’ may be created in some cases. For example, if companies are seen to accept a significant number of trading options, this can create an additional motivation for new participants to engage in the

<sup>40</sup> If a considerable number of bids were being submitted by potential new market participants, this option could be reviewed in the future to an annual bid submission window.

### Consideration of design options

market.

- **Mandatory disclosure via annual reports.** This is not a preferred option, since the information on bids is only relevant for market participants, and publishing the information via annual reports would disclose information to a much wider audience. This is an unnecessary risk from the perspective of companies and does not bring any material benefits.

### Practical challenges

#### 1.14 Relationship to WRMP

#### **Assessment to be separate from WRMP, but is expected to make use of the existing tools.**

The mandatory assessment of bids can be developed as a separate process from the WRMP. Companies may be able to limit the extra costs of a separate process by making use of tools already at their disposal from the WRMP process. For example, companies can use the same models and techniques for WRMP and for the bid assessment process to carry out the assessment effectively.

Depending on the frequency with which the assessment is carried out (see point 1.12), this approach can be seen as an ‘adaptation of WRMP’ (although WRMP is a statutory process, and the bid assessment process is not) that builds on the existing tools, and potentially increases the frequency with which some of the elements of WRMP process are carried out.

This approach strikes a balance between developing a completely new assessment system (which risks imposing excessively high costs on the industry) and having a clear standalone process designed specifically to support the assessment of new trading options. Such clarity helps develop market participants’ confidence in the system.

The market design is such that bids would only be accepted by companies if they were expected to benefit the company and its customers. As a result, they would not be expected to represent a ‘material change in circumstance’. (If this were the case, this may trigger a re-submission of the entire WRMP, which would not be a desirable side effect of the water trading design).



**4. Bid Assessment Methodology**

**Problem being addressed**

There is a risk that in the absence of a common methodology water companies may not always make consistent and comparable decisions on potential bids. In the absence of such methodology, third parties would have limited visibility and confidence in the process, and may perceive that there is not a level playing field among market participants.

**Relevant issues**

- There are different variants of bid assessment methodology that could be developed, ranging from a detailed common rules-based assessment methodology to a situation where all companies make their own decisions with limited guidance from the regulator.
- The main objective of the methodology is to support market transparency, efficiency and predictability.

**Options considered**

Level of intervention	Low	High
Component	←—————→	
<b>4 Bid assessment methodology</b>	No defined methodology	Tightly defined methodology
Recourse option	No defined process	Common process via Ofwat
National coordination	Not required at this stage	Mandated National coordination

**Proposed market design component**

The proposed solution is for companies to apply a consistent principles-based methodology in assessing individual bids. This approach is not excessively prescriptive and/or costly to develop, but in combination with minimum quality criteria for the bids, is intended to provide bidders with sufficient clarity on the evaluation process.

**Ofwat Water 2020 Assessment criteria**

A principles-based bid assessment methodology is flexible and responsive to the evolving nature of the market and encourages companies to focus on the optimal outcomes for their customers. The principles underpinning the methodology need to be designed to reflect the challenges to the resilience, affordability and environmental sustainability. A principles-based assessment methodology strikes a balance between an arbitrary bid assessment and a complex rules-based methodology, which would not provide sufficient flexibility.

## Consideration of design options

### 1.15 Methodology vs principles

#### **Companies to apply a principles-based methodology for bid assessment.**

Options considered:

- Detailed 'common assessment methodology' would require that the industry develops a set of detailed rules on how potential bids can be unambiguously ranked. A fully objective and deterministic assessment would need to be based on a detailed set of parameters (including water quality, reliability and cost) and trade-offs between these parameters. Considering that each potential scheme is likely to be unique, such a set of rules would be excessively complicated and costly to develop, and potentially not suited for all circumstances. Moreover, the design of the rules could be exposed to undue influence by market participants with private interests.
- A principles-based approach may be more appropriate for the water industry, as it enables companies to exercise some discretion in assessing complex multi-dimensional sets of options and can be adapted to a wide range of conditions.

If necessary, a detailed methodology can be prepared later on, but the market can be initially developed using a principles-based approach.

### 1.16 Recourse options

#### **A recourse option to be available to market participants in the event of their bid being rejected.**

Options considered:

- No defined process. This is not a preferred option since a principles-based assessment does not necessarily result in an objectively measurable ranking of potential options. The discretion that companies will exercise in making partially subjective investment decisions may be perceived as discriminating by parties whose schemes have been rejected.
- Company specific recourse. This is not a preferred option, since it may not appear to be sufficiently credible (and non-discriminating) from the perspective of individual market participants.
- Common approach via Ofwat. This is the preferred approach, since it appears to be the most credible option that provides market participants, particularly the smaller ones, assurance that they will not be discriminated against. However, a balance needs to be struck between giving third parties excessive opportunities for legal challenge (which is costly for the industry as a whole), and between making it excessively difficult to challenge companies' decisions (which would leave the decision-making process appear too arbitrary).

## Consideration of design options

Public and regulatory scrutiny of the accepted and rejected bids can help with finding the right balance on these two issues.

Ofwat may have the powers to arbitrate disputes, if necessary, through its Competition Act powers.

### **National water market coordination not to be implemented at this stage.**

Identification of the best interconnection options for the overall system resilience may not be possible if each individual company makes the assessment from its own private perspective. This could be overcome either through a PR reward/penalty mechanism or through suitable principles for the common assessment methodology.

Options considered:

- **National coordination included as a design principle and/or mandated on regional or national level.** A 'national water market model' could be developed, based on the mandatory information database, which could be used to identify options that are beneficial from a system-wide perspective. This could build on Ofwat's existing modelling and/or WRSE's model.

### **1.17 National coordination**

This is not the preferred option, since the process would be complex and does not tie in directly with the principle of private companies putting forward bids for companies to assess. For example, it is not clear who would have the power to mandate specific schemes to be invested in, if they are not in the companies' private economic interests, and how the costs would be recovered.

- **No coordination.** This is the preferred option, since it does not impose any excessive costs on the industry that would be disproportionate to the size and value of the water trading opportunity. It is therefore appropriate to introduce the water market without the consideration for national coordination.

Where companies have voluntarily entered into regional organisations that have considered local opportunities for coordination this should not be discouraged, but there is no need to replicate this at the national scale.

**Practical challenges****1.18 Principles development process****Principles to be developed in collaboration between industry, regulators and financiers.**

A number of stakeholders may be interested in contributing to the development of the bid assessment principles. Collaboration through a form of 'industry forum' contributes to the development of a common understanding of the principles and reduces the need for further clarifications and arbitration to be provided by the regulators.

- Companies' participation ensures that practical suggestions are considered;
- Regulators' participation gives more protection to new entrants and small companies, such that the principles are not unduly biased against new entry.
- Financiers' views may be taken into account to understand the impact of the principles on projects' bankability.

The principles may need to be 'back-tested' with the industry to review the recent decisions made by companies in their WRMPs to identify potential shortcomings before 'going live'.



## 5. Risk allocation and economic incentives

### Problem being addressed

Economic incentives for trading do not appear to be sufficient and/or appropriately structured in order to compensate for the risks that are undertaken by water buyers and sellers. A number of stakeholders have indicated that security of supply issues and/or a lack of long-term economic incentives act as barriers to trading.

### Relevant issues

- Based on stakeholder engagement, security of supply concerns appear to act as a disincentive to trading.
- Asymmetric treatment of internal and external sources of water from the risk perspective<sup>41</sup> implies that the penalties create a bias against trading.
- Interconnection requires long-term investments, and the regulatory framework needs to provide financial incentives that are structured appropriately for the long-term.
- RCV and cost of capital risks. An appropriate market design may need to consider the impacts of water trading reforms on long term investment.

### Options considered

Level of intervention	Low ←————→ High			
Component				
5 Risk allocation and economic incentives	No additional incentives		Extend PR14 incentives	Develop new longer term incentives
Security of supply issues	No change	Contractual requirement	Restructure penalties under supply obligation	Develop industry code for supply curtailment
Interconnection incentives	No additional interconnection incentives			Develop specific incentives

### Proposed market design component

The proposed solution is to implement a number of measures to overcome the security of supply barrier and to provide longer-term economic incentives. However, separate financial incentives for interconnection projects are not recommended.

### Ofwat Water 2020 Assessment criteria

This approach is focused on delivering key outcomes through the use of effective incentives. It aims to strike a balance between the affordability of customer bills, relative to the system resilience and environmental sustainability. By building on the existing incentive structures, it is relatively straightforward to implement.

<sup>41</sup> The asymmetry arises for example in the non-delivery from a particular source. If that source is an internal one, companies may be able to balance the shortfall internally and not incur any direct penalties. However, if an external source of water does not deliver, then contractual penalties start applying.

Consideration of design options

**1.19 Overcoming the security of supply barrier to trading**

**Encourage smarter/better contracting and develop non-mandatory guidance for supply curtailment rules.**

Companies currently consider, and are expected to continue to consider, security of supply as a major factor in assessing any potential trading opportunities. The following measures can help overcome the barrier:

- Encourage smarter contracting (e.g. tiered financing) and hedging, for example through the publication of case studies and/or worked examples;
- Develop clearer and non-discriminatory rules for supply curtailment (and/or for sharing non-delivery by a particular water source), particularly where this affects cross-border supply. For example, companies may need to be encouraged to structure contracts in a way that allows buyers and sellers to ‘share’ any shortfalls in source delivery in a proportionate manner (as opposed to the seller simply ‘cutting-off’ the supply).

Options considered:

- **No change.** This is not a preferred option, since it fails to address the challenges the industry is currently facing.
- **Non-mandatory approach.** This is the preferred approach to overcoming the security of supply barrier. This is because the barrier has been found to be partly cultural / behavioural, and it may disappear ‘on its own’ as and when more trading develops in the industry.
- **Industry code for supply curtailment.** This is not a preferred approach, since it goes against Ofwat’s objective to enable companies to take ownership of their own activities. It also limits the flexibility of the potential contracting solutions and may act as a barrier to innovation.

**1.20 Long-term incentives**

**Review existing incentive mechanisms and consider strengthening them within the existing framework.**

Stakeholder engagement as well as recent literature (including SE Water and Frontier 2015) have indicated that the impact of totex and PR14 trading incentives have had limited impact on motivating very long term investments. However, as set out in the main body of the report, it appears to be too early to reach conclusions on the impact of totex and new trading incentives and whether or not these may need to be developed further.

As a first step, Ofwat may consider reviewing the impact of the incentives on trading. The options to be considered as part of this assessment should include:

- No additional incentives;

## Consideration of design options

- Extension of PR14 incentives; and
- New long-term incentives.

It is not possible to recommend which of the three options listed above is appropriate at this stage. However, as a second step, longer-term economic incentives, if found necessary and appropriate, may include:

- Longer periods during which companies can retain benefits from trading, for example to align with the lifetime of the schemes;
- Higher percentage of benefits that can be retained by companies, on its own; or
- A combination of the above.

Ofwat is to decide on the appropriate implementation of this measure, depending on whether and when sufficient information is available to assess the impact of the PR14 measures. If possible, this could be implemented as early as PR19.

### **No separate financial incentives for long-term interconnection projects.**

As an alternative to strengthening the existing incentive structure, it may be possible to design financial incentives targeted at interconnection projects themselves.

The two main options considered are whether or not to implement separate financial incentives.

To implement separate financial incentives, it may be possible to split the capital cost of interconnection projects between the buyer and the seller, and reward it at a higher 'cost of capital + X' rate.

The downside of this option is that:

- It appears too arbitrary, and it does not seem appropriate to balance a regulatory bias with another regulatory bias, hoping that somehow the resulting balance will be 'better';
- The unique nature of each interconnection project means that an appropriate level of additional compensation would be difficult to estimate, likely to be disputed by some market participants as 'unfair'; and
- It creates a bias away from other schemes such as leakage mitigation projects. This is particularly relevant, considering that companies' financial resources are limited, so their investment needs to be targeted in an efficient and effective way.

On balance, the downside features of separate financial incentives outweigh the upside ones and it is recommended that such incentives are not implemented at this stage.

### 1.21 Incentives for interconnection



**6. Contract template**

**Problem being addressed**

There have been limited volumes of trading in the past, so the industry is lacking templates for contractual arrangements that provide adequate protection in system stress events.

Some of the contracts used in the past in the industry were based on a ‘best endeavours’ commitment, which has failed to address companies’ (particularly importers’) security of supply concerns.

Finally, new entrants to the industry face significant search and transaction costs in negotiating new trading contracts, and may perceive to be at an information and experience disadvantage compared to the incumbents.

**Relevant issues**

- Drafting trading contracts from scratch leads to unnecessary transaction costs for the industry as a whole.
- There may be a perception by new entrants that they are being disadvantaged in relation to incumbents who have more trading experience, and this may act as a barrier to trading.

**Options considered**

Level of intervention	Low ←————→ High	
Component		
6 Contract template	No standard template	Standard template clauses or bilateral contracts with certain clause requirements
	Bi-lateral contract only	Standard template clauses only

**Proposed market design component**

A contract template can provide a starting point for negotiations and provide information to new entrants on the expected range of issues to be covered in a contract, together with ‘common practice’ suggestions.

**Ofwat Water 2020 Assessment criteria**

Availability of contract templates has the potential to reduce transaction costs for market participants and provide a level playing field from the perspective of new entrants. Contract clauses relating to the security of supply help addressing the problems of system resilience and affordability. The non-mandatory approach provides companies the freedom to use the contract template if it is helpful, but does not impose an unnecessary compliance burden.

## Consideration of design options

### Non-mandatory contract template to be provided to the industry.

Options considered:

- **No template / bilateral contracting.** This is not the preferred option, since it does not improve on the status quo and does not address the problems identified above.
- **Voluntary contract templates.** This is the preferred option, since the industry is assumed to continue contracting on a bilateral basis. It does, however, bring the benefits of reduced transaction costs and a more level playing field, particularly for smaller market participants.
- **Mandatory contract clauses / full templates.** This is not the preferred option, as it limits contractual flexibility and scope for innovation and is unlikely to be suitable for all potential market circumstances.

### 1.22 Purpose

A trading contract template should serve two principal purposes:

- Reduce transaction costs (for all parties);
- Provide examples of ‘common practice’ drafting related to issues often encountered by market participants, and to share ‘best practice’ approaches to contracting with all parties; and
- Remove barriers to entry to new companies (a perception that incumbents may wish to impose conditions that are excessively difficult to comply with).

However, the contract template should not:

- Prevent innovation in contracting arrangements from taking place;
- Mandate the use of standardised contracts for all circumstances;
- Prevent risk-management clauses from being inserted in the contract where these are appropriate (as opposed to being intentionally developed in order to discourage trading); and
- Compromise financeability of new projects, for example due to loose drafting and/or insufficient clarity.

## Practical challenges

### 1.23 Contents of contract template

#### **Broad-range to cover key clauses, but not excessively detailed contents.**

Trading contracts are likely to cover a wide range of circumstances and may therefore need to be adapted appropriately to each situation. A standard contract can therefore serve as a starting point for the negotiations, but in order to be able to cover for the variety of circumstances, it may need to be relatively generic.

A Contract template may need to cover a wide range of issues, in order to capture the possible issues that may arise. These may include: contract duration, volumes, cost and price, quality, non-delivery provisions, sharing of resources in the event of system stress, force majeure.

Where appropriate, contract template should include drafting for certain clauses, particularly where these could be contentious between market participants.

For example, risk-sharing clauses may be provided to indicate the typical arrangements the regulator might expect from the companies to enter into. The purpose of these is to give new entrants a source of information to use when entering commercial negotiations with incumbents, and to mitigate the information asymmetry between them.

### 1.24 Value-sharing

#### **No regulation on buyer-seller value sharing.**

The contract template would not be expected to provide guidance on value-sharing among market participants. The assumption is that such trades would be essentially non-regulated, resulting from private bilateral negotiations between buyers and sellers.

Some regulatory oversight may still be required to ensure non-discrimination of smaller players. Initially, it is assumed that the existence of a contract template would be sufficient to enable new entrants to negotiate effectively.

Finally, guidance may need to be provided by the regulator in relation to some specific types of value sharing – for example in relation to inset appointees. Stakeholder engagement has identified a potential risk related to the pricing of contracts for inset appointees, suggesting that there is uncertainty on the extent to which the pricing can depart from the bulk supply tariff. While it may not be appropriate to reflect this in the contract template itself, some regulatory guidance may be helpful.

**Examples from other industries**

**US Power Purchase Agreements (“PPAs”)**

The Federal Energy Management Program (“FEMP”) under the Office of Energy Efficiency & Renewable Energy has been set up to help US federal agencies to use on-site renewable energy PPAs. To support the PPA process, FEMP has worked with federal agencies and other parties to assemble sample documents from previous on-site renewable PPA projects (ENERGY.GOV). The sample agreements include the requests for proposal and contracts, land use agreements, as well as PPA agreements themselves.

**UK Contract for Difference (CfD)**

Department of Energy & Climate Change (“DECC”) in the UK has published a set of standard CfD terms and conditions to streamline the CfD process. However, CfDs are different from the contracts in the water sector in that they are not bilaterally negotiated amongst multiple parties, but rather agreed with a counterparty for the CfDs, which is a Government-owned company rather than a private company.



**7. Market codes**

**Problem being addressed**

A newly developed water market can be exposed to a number of risks such as market power, and an uneven playing field for new entrants who may not be as familiar with the industry functioning as the incumbents are.

**Relevant issues**

- The purpose of industry codes is to define the key processes for engaging in the market, and to prevent inappropriate market behaviour from emerging.
- In a new market, industry codes can help to reduce barriers to entry and to create a level playing field for new entrants.
- The governance process and the detailed design of industry codes are key to their success.
- The scale of potential trading, compared to the cost of developing new market codes, is a relevant factor when considering the introduction of new codes.

**Options considered**

Level of intervention	Low			High
Component				
7 Market codes	No additional codes	Process for considering bids	Company specific codes	Industry wide code

**Proposed market design component**

Since the development of new codes can be complex and difficult to agree between multiple participants, the recommendation is that no new market codes are developed for the purposes of water market.

**Ofwat Water 2020 Assessment criteria**

The experience from retail water markets and other sectors indicates that the development of new market codes can be a complex and time consuming exercise. By building on the existing PR14 approach, and relying on contractual solutions to trading challenges, such costs of developing market codes are avoided. This seems proportionate to the scale of the opportunity.

## Consideration of design options

1.25 <b>Number of industry codes</b>	<p><b>No additional market codes to develop the market, but this would be kept under review as the market develops.</b></p> <p>As part of the PR14 water trading incentives, companies need to develop their own Trading and Procurement codes to qualify for the incentives. A new code for water trading may add another layer of complexity and make it more challenging for companies to engage effectively in the market.</p> <p>The industry code should not in itself form a barrier to innovation. For example, the code should not prevent the emergence of new contracting approaches and/or other innovations in possible trading arrangements.</p> <p>Options considered:</p> <ul style="list-style-type: none"> <li>• Not to develop an additional market code for water trading beyond the existing PR14 related codes.</li> <li>• Develop an additional set of principles that companies need to adopt, which would be less complex than an industry code and may be more appropriate to support the development of the market, at least initially.</li> <li>• Develop a new industry wide code for water trading, but this would not be aligned to the approach taking by Ofwat for PR14.</li> </ul> <p>Based on Ofwat’s modelling there does not appear to be evidence to suggest that there will be a sufficiently large number of trades in the short term to justify the costs of the introduction of a new market code. This conclusion may be revisited if the actual number of trades that come forward in the future is materially higher.</p> <p>As a result of this conclusion, the coverage and governance of a new market code is not relevant. However, both of these would need to be considered in the future, should a new code prove to be necessary.</p>
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## Examples from other industries

<b>Energy</b>	<p>The energy industry has established a set of industry codes that underpin the energy markets, and must be followed by all licence holders. For example, in electricity sector, there are seven separate codes.</p> <p>However, these codes were found to be very detailed and complex by the recent Competition &amp; Markets Authority (“CMA”) investigation (March 2015). The investigation found that “the existing governance and modification arrangements can lead to inconsistent or delayed outcomes, and create material burdens on parties, in particular smaller ones, which could undermine their incentives to promote changes”, and that this may in turn lead to consumer detriment.</p>
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**8. Value sharing**

**Problem being addressed**

A key component of market design is the balance in terms of sharing the benefits of trading between companies and customers. This is because one of the objectives of increasing volumes of water trading is to reduce the overall costs to the industry, and ultimately to reduce consumer bills. However, at the same time, for companies to have an incentive to trade, they need to retain a share of the cost reductions.

**Relevant issues**

- The long-term investments in interconnectivity that companies would need to make to enable more trading to take place may potentially be seen as risky, if there is limited guarantee that companies’ profits will not be clawed back for the benefit of consumers. A well-known time-inconsistency problem with the regulatory commitment therefore needs to be considered when designing the market.
- Ofwat’s policy objective of ensuring companies have a long-term focus.
- Ofwat has also signalled that it may not always prefer “lower customer bills” compared to “right customer bills”, particularly where the difference reflects the importance of the system resilience.

**Options considered**

Level of intervention	Low	←—————→				High
Component						
8 Value sharing	Existing PR14 incentives	Absolute value return	Cap on return	Cap on return, tiered	No cap on return	

**Proposed market design component**

The recommended approach is to review the potential options to strengthen the PR14 incentives (without going as far as proposing a no-cap approach). However, the preferred design of the incentives is not specified here, since additional quantitative analysis would be required to identify the preferred approach

**Ofwat Water 2020 Assessment criteria**

A suitable value sharing mechanism supports market development by providing adequate incentives for trading. The value-sharing mechanism aims to strike a balance between the status quo, and an uncapped return on investment, which could result in excessive returns to some companies, and limited sharing of the benefits from trading with customers. The mechanism can be implemented in relatively straightforward manner by adapting existing regulatory framework.

**Consideration of design options**

**No recommendation on preferred value-sharing mechanism possible in the absence of further analysis.**

The current incentives for trading involve companies retaining some of the profits generated, but only for a limited period of time.

Options considered:

- Retain PR14 incentives;
- Strengthen the PR14 incentives, but retain a form of cap (see below); or
- Strengthen the PR14 incentives, but without imposing any cap on the return companies could earn.

The preferred option is either the first or the second one of those listed above. The last one is not recommended, since it does not involve sharing benefit from trading with customers. To determine which of the first two options is preferred, additional quantitative analysis would be required.

**1.26 Mechanisms for value sharing**

If a strengthening of the PR14 incentives was found to be appropriate, alternative and/or complementary approaches could involve companies:

- Benefiting from an absolute value of the return (£);
- Keeping [x]% of the value generated, for the entire duration of the scheme;
- Keeping [x]% of the value generated, which would be time-limited, for example for 10 years; or
- Value-sharing mechanism could be tiered by the size of the trade, or over time.

The preferred approach needs to consider the fact that there is a wide variety of potential schemes, each with a different lifetime.

The preferred approach may also consider the extent to which a regulator may be willing to lock themselves (and the customers) in for long-term schemes, particularly where it not known if new future opportunities may provide better value for money.

**Practical challenges**

**1.27 Regulatory commitment**

**Learn from other industries to demonstrate regulatory commitment through clarity on long-term regulatory framework, consistency and ‘no surprises’ policies.**

The time-inconsistency problem of regulatory commitment has been documented in literature, and the debate is not repeated here. From the regulator’s perspective, long-term economic incentives need to be supported

**Practical challenges**

through a regulatory system that:

- Provides a sufficiently long-term commitment (particularly where extra returns are retained by companies);
- Is seen as credible by a variety of stakeholders, including companies, their shareholders and other financiers; and
- Potentially includes mechanisms for dealing with any unexpected windfall profits to avoid 'regulatory surprises' and boost the credibility of the system.

There are a number of examples from other industries that have shown that UK regulators have been able to make relatively long-term commitments, although none of them approached the very long term nature (>40 years) of some of the investments in the water industry.

**Examples from other industries**

**Energy**

In the energy sector, infrastructure investments generally involve substantial capital investment undertaking. Regulatory frameworks provide clarity to market participants over relatively long time periods, including for CfDs (typically 15 years), Offshore Transmission Owners ("OFTO") (20 years), and RIIO (8 years).

These precedents indicate that it is possible for regulators to commit to longer time periods of financial returns, when required to support long-term investment opportunities.



## 9. Market structure

### Problem being addressed

The current industry structure may or may not be suitable for the development of a water market. Compared to the status quo, there may be different degrees of separation (functional, accounting, ownership, etc) that may be more or less conducive to trading.

### Relevant issues

- Existing literature has included suggestions of functional separation of system operators (Ofwat 2011) as well as other types of separation (Stern).
- However, any separation tends to lead to major disruptions and relatively high costs to the industry. These costs need to be balanced against any potential benefits from achieving such separation.

### Options considered

Level of intervention	Low	High
Component		
9 Market structure - system operator	No change	Structural separation

### Proposed market design component

The recommendation is to retain the current industry structure, without any structural and/or functional separation of existing market participants. It is anticipated that the framework is going to enable new market participants to enter the market, which will in itself change the composition of the industry.

### Ofwat Water 2020 Assessment criteria

The existing market structure already provides the framework that is pro-market and outcomes focused. Changes to market structure would be a costly, complex and disproportionate solution to the challenges of water trading. Unbundling of upstream water licences appears to be a sufficient initial step in developing water market in England and Wales.

### Consideration of design options

1.28 <b>System coordination</b>	<p><b>Existing system (without a functionally separated system coordinator) can be expected to deliver desired outcomes.</b></p> <p>The options considered include a functional or even structural separation of system operators in each incumbent company to support the development of water trading.</p> <p>However, to further develop water trading at this stage, the case for</p>
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functional separation of system operators is limited. Centralised coordination is anticipated to be costly and with limited benefits (Summary of responses to consultation on ‘straw man’, Ofwat).

There is no need for wholesale and retail separation, provided that codes, recourse options and other rules as set out above are in place to ensure level playing field between incumbents and new entrants.

Restructuring and the associated increase in uncertainty would risk increasing the industry’s cost of capital with associated adverse impacts on financeability and/or consumer bills.

At this stage, any changes to the fundamental system structure would appear to be a disproportionate approach to addressing the challenges related to trading.

### Practical challenges

#### **Non-discrimination of smaller players to be ensured through other mechanisms.**

#### **1.29 Discrimination**

In the absence of industry restructuring, regulatory oversight may be required in order to ensure smaller players are not discriminated against. Industry codes, as well as the possibility of recourse to Ofwat in relation to bid assessments would help in this context.

## Appendix B Stakeholder engagement

Deloitte has engaged with a number of stakeholder as part of the work with Ofwat in order to collect their views on a range of issues related to water trading in England and Wales.

The list of third parties who participated in this work can be found in Table 13.

**Table 13: List of third party stakeholders**

Category	Name of organisation
Regulator	Environment Agency Defra
Appointed companies	Anglian Water Portsmouth Water Severn Trent Water South East Water Southern Water Sutton and East Surrey Water Thames Water Wessex Water
Smaller water companies	Albion Water Peel Utilities Holdings

## Appendix C Sources of information

In-text citation	Source
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FT	UK telecoms market is a success story, Financial Times. Retrieved in August 2015: <a href="http://www.ft.com/intl/cms/s/0/f04e4a06-c9b1-11e4-b2ef-00144feab7de.html#axzz3jopOhEaD">http://www.ft.com/intl/cms/s/0/f04e4a06-c9b1-11e4-b2ef-00144feab7de.html#axzz3jopOhEaD</a>
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NAO 2013	Infrastructure investment: the impact on consumer bills, National Audit Office, 13 November 2013
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Ofwat 2015	Harnessing upstream water markets – what's to play for? Ofwat, January 2008 & Towards Water 2020 – policy issues: promoting markets, Ofwat, July 2015 & Towards Water 2020 – meeting the challenges for water and wastewater services in England and Wales, Ofwat, July 2015
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Ofwat Independent Review Final 2008	Independent review: of competition and innovation in Water Markets: Final report, Ofwat, April 2009
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PR methodology 2013	Setting price controls for 2015-20 – final methodology and expectations for companies' business plans, Ofwat, July 2013
Queensland Government Business and Industry Portal	Water markets and trading, Queensland Government Business and industry portal, Australia, retrieved in August 2015: <a href="https://www.business.qld.gov.au/industry/water/managing-accessing/markets-trading">https://www.business.qld.gov.au/industry/water/managing-accessing/markets-trading</a> .
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## Appendix D Glossary of terms

Acronym	Notes
<b>AIM</b>	Abstraction Incentive Mechanism
<b>AISC</b>	Average Incremental Social Costs
<b>AMP 8</b>	Asset Management Plan 8
<b>CAMS</b>	Catchment Abstraction Management Strategies
<b>CfD</b>	Contract for Difference
<b>CO<sub>2</sub></b>	Carbon Dioxide
<b>DECC</b>	Department of Energy and Climate Change
<b>DEFRA</b>	Department for Environment Food & Rural Affairs
<b>DWI</b>	Drinking Water Inspectorate
<b>EA</b>	Environmental Agency
<b>EU ETS</b>	EU Emissions Trading System
<b>HRA</b>	Habitats Regulations Assessment
<b>MDB</b>	Murray Darling Basin
<b>NAO</b>	National Audit Office
<b>NPV</b>	Net Present Value
<b>Ofwat</b>	Water Services Regulation Authority
<b>OFTO</b>	Offshore Transmission Owner
<b>PPA</b>	Power Purchase Agreement
<b>PR</b>	Price Review
<b>PR14</b>	Price Review 2014
<b>PR19</b>	Price Review 2019
<b>RIIO</b>	Revenue = Incentives + Innovation + Outputs
<b>RCV</b>	Regulatory Capital Value
<b>SEA</b>	Strategic Environment Assessment
<b>SOSI</b>	Security of Supply Index
<b>Totex</b>	Total expenditure
<b>WREA</b>	Water Resources East Anglia
<b>WRMP</b>	Water Resource Management Plan
<b>WRSE</b>	Water Resources in the South East Group
<b>WRZ</b>	Water resource zones