KPMG

New business models in the water sector

A report prepared for Affinity Water

5 December 2016

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Abstract

KPMG has been commissioned by Affinity Water to identify potential new business models and new business activities that might emerge in the water and wastewater sectors now and in the future.

A number of new business models are already emerging as a result of legal and regulatory changes introduced recently as well as a result of business innovation. Other models and activities are implied by the parts of the new Water Act that have not yet been fully implemented, such as the introduction of upstream competition.

The focus of this report is on more innovative business model and activities rather than those already emerging or directly implied by regulatory reforms. Many of these models need to be enabled by further regulatory or legal change, and have been identified here because they could create further benefits for customers in the right circumstances.

Some new models could emerge without much further change, in which case the questions we address are whether sufficient incentives are in place for water companies to introduce them.

We have considered how these new models identified by us could create benefits for customers and whether they would require more regulatory reform or new legislation to drive them.

In general, structural change in the retail and the upstream segments could create significant customer benefits, and the early experience with the introduction of retail competition is that it has, at the very least, already stimulated significant new thinking.

Significant challenges face the sector and this has prompted continuing regulatory change. Measures to introduce structural change, competition, or new business models and activities, as currently set out, are unlikely to be enough. Even under 'central case scenarios' the impact of population growth, climate change, challenges to resilience and water scarcity, mean that further investment and new business approaches are likely to be required.

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1 Executive Summary

The water sector is facing a number of significant challenges, for example climate change, population growth, the need for increasing resilience, and ever rising customer expectations. At the same time there is a need to maintain an affordable service and public trust. The full extent of these challenges is uncertain, but they are likely to be significant. Ofwat's regulatory reforms will continue to drive different behaviours and new business models but on their own are unlikely to address all the challenges. There is a case for the sector to consider collectively how to go further.

Pace of change

The Water Act 2014 and the changes introduced by Ofwat at PR14 are already driving the emergence of new behaviours, business models and activities. Ofwat has proposed further changes through its Water 2020 framework, again in line with the new UK Government legislation. Some disruptive changes of existing arrangements have already begun. This is especially the case in the non-household retail sector, but fewer changes are apparent in the upstream and network segments to date.

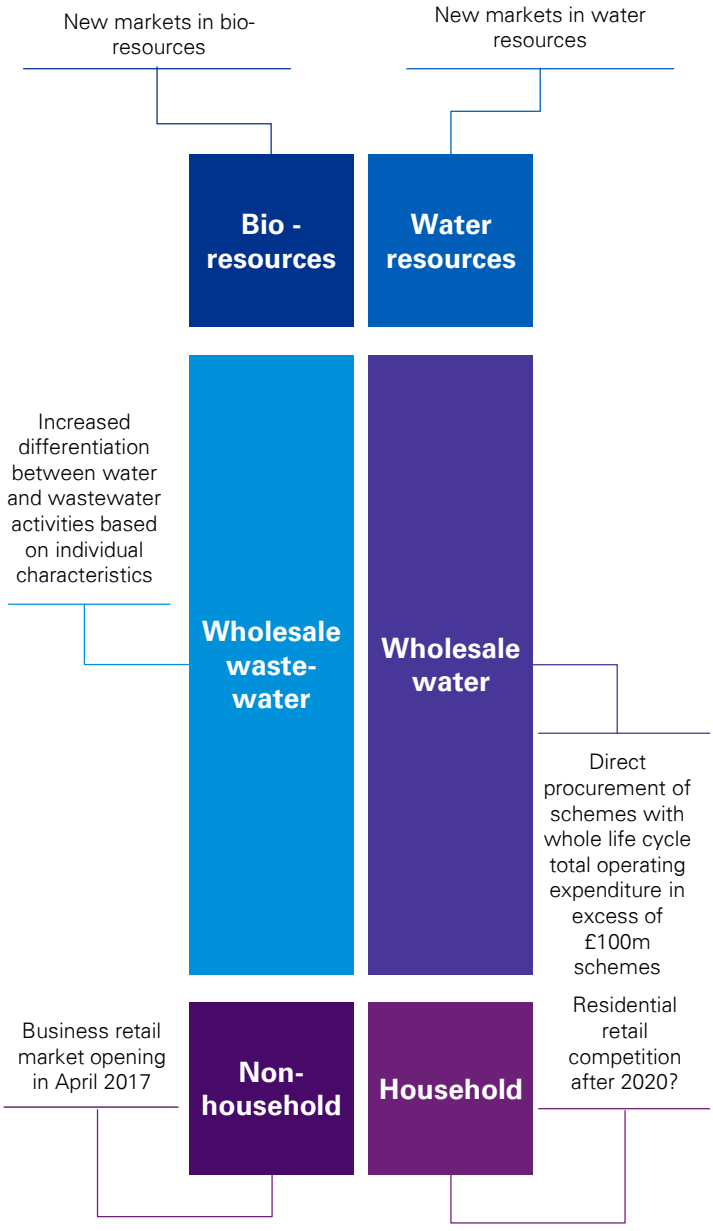
Further regulatory changes now appear inevitable and they will drive new business models. New models implied by the existing legal and regulatory changes include:

- abstraction licence trading;
- upstream water entrants selling to incumbents and wholesale network operators;
- upstream water entrants selling to new retailers;
- water trading between today's incumbents;
- markets in bio-resources; and
- operators taking direct ownership of assets and activities via Ofwat's 'Direct Procurement for Customers' proposals.

These new business models and activities should help to tackle challenges, for example by delivering improved water efficiency, and better allocation of resources. These new models impact on a relatively small proportion of the total cost base within the sector and do not cover the more substantial assets, operations and ultimately the costs that make up customer bills. This report suggests that even if the challenges develop in-line with central estimates, the new models may be insufficient to make a big enough difference.

As a result, we have considered alternative models that might complement the new emerging framework in terms of addressing the challenges. These models have been derived from observing parallel models in other sectors (notably energy) and by extrapolating trends already emerging in water and wastewater.

Changes and new models already under consideration



Source: KPMG analysis

New and innovate potential models

We have identified a range of alternative and more innovative models and business activities. Some offer demand side responses to support the reduction of water use. For example:

- **Demand aggregator.** A retail company aggregates demand across a range of customers and provides demand reduction as a service to network companies. This model already exists in energy.
- **Multi-utility retail consolidation.** This could occur through retailers offering water, wastewater and other utility services together. This could be extended to residential customers if this market becomes competitive.

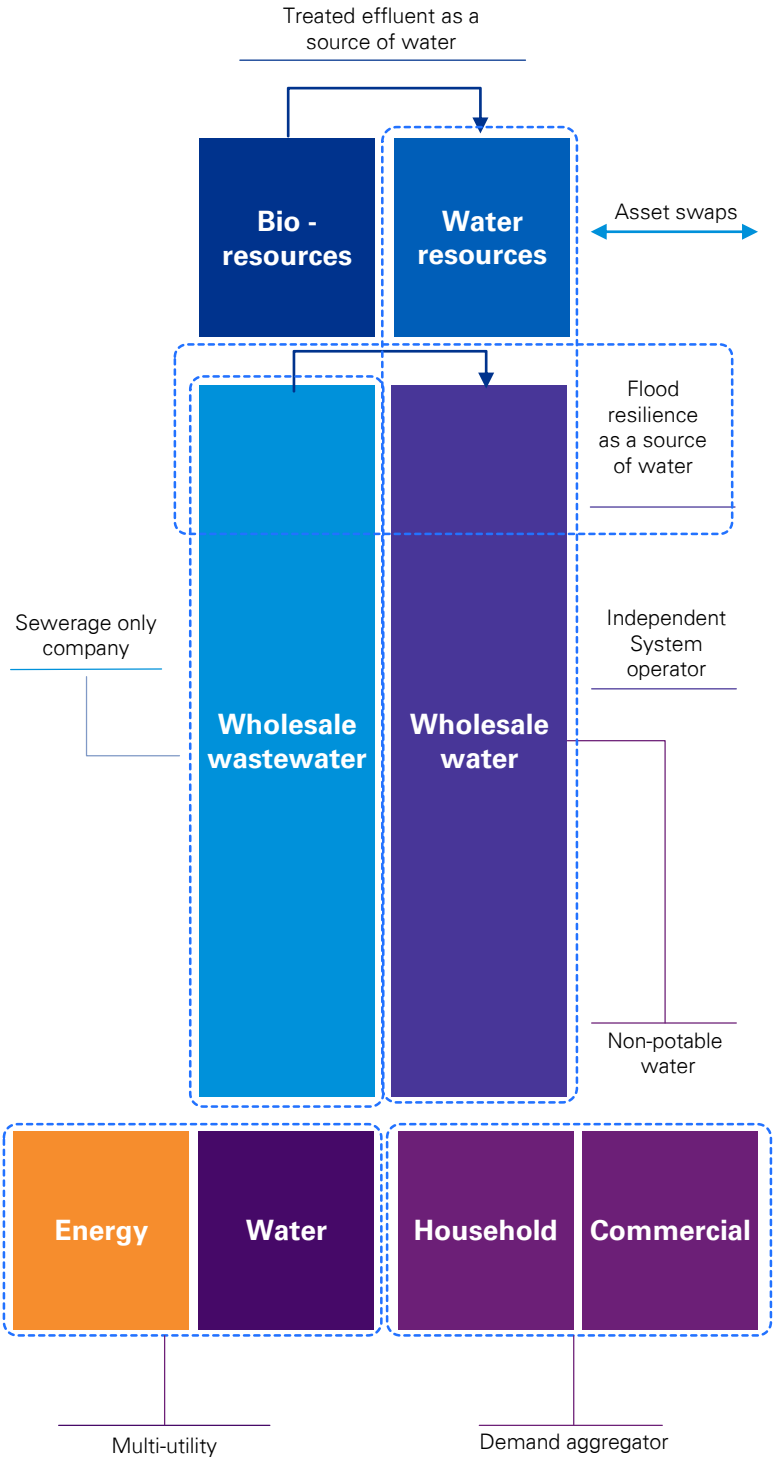
Some models offer potential for better management of scare water resources and some offer more optimisation across company boundaries. For example:

- **Non-potable water.** Incentivising greater use of non-potable networks and supplies would reduce pressure on drinking water supplies.
- **Treated effluent as a source of water.** Re-using effluent occurs in some other countries but there may be a presumption against re-use in Britain.
- **Flood resilience as a source of water.** New flood defences could be built that enable the collection and re-distribution of rainwater as a source of supply.
- **Asset and licence area swaps.** Companies could exchange assets to help optimise management of catchments.
- **Independent System Operators. ("ISO")** An ISO could improve the current system of allocation and use of scarce water supplies.
- **Sewerage-only company.** Continuing divergence of the regulation of water and wastewater could allow the voluntary creation of a sewerage only company ("SoC"), analogous to a WoC (i.e. a water only company).

The example of wholesale and retail separation shows that increased focus on a single business activity, driven by regulatory change, can create greater management focus. Where this can extend efficiency gains, it can help to support affordability through increased efficiency and the potential to mitigate or delay new investment.

A new approach to flood resilience may be needed as a result of increasing incidence of serious flooding. The benefits of new flood resilience schemes could be enhanced if schemes were designed to store and re-use excess water.

New models identified in the report



Source: KPMG analysis

Key findings and implications

Each of these new business models and new activities has been chosen firstly for their capacity to help address some of the challenges faced and secondly because they are not currently directly implied under the existing framework. The majority might be challenging to implement under the current legal and regulatory framework and some may not be commercially viable today. Even where in principle the models could be developed now (for example assets and licence area swaps carried out between incumbents) there have been few examples of them to date.

If any of these models are considered to provide benefits, there may need to be a 'pump-priming' by the regulator principally through greater regulatory incentives to encourage their development.

A recent example is the efforts of multiple agencies to provide greater incentives for water trading. The public benefits would appear to be clear but multiple changes have been developed by the Environment Agency ("EA"), Ofwat and the Water Act frameworks to create stronger incentives.

Whatever the extent of the success of existing reforms, it seems likely that some level of new investment would be needed under the existing framework to address the challenges faced. This is likely even under central case estimates of the scale of the challenges.

Individually the models identified are capable of generating benefits but no one model is considered to address all the challenges simultaneously. The new models and activities can work in combination to re-enforce each other. It is these combinations that suggest there is a case for encouraging multiple models to develop.

Since privatisation investors have been willing to contribute new capital that has financed continuing investment in the sector. Whether changes are introduced via new regulation, or voluntarily by companies, the willingness of investors to continue to contribute new capital is an important factor in delivery of additional benefits to customers.

Further regulatory and legislative reform, and willingness from companies and investors to explore new opportunities, is likely to be needed to facilitate their introduction effectively in the future.

Continuing work to enable additional, and more innovative, business models and activities will support a more dynamic sector, where there is the room and the incentive for private sector water companies to develop and implement innovations that will benefit customers.

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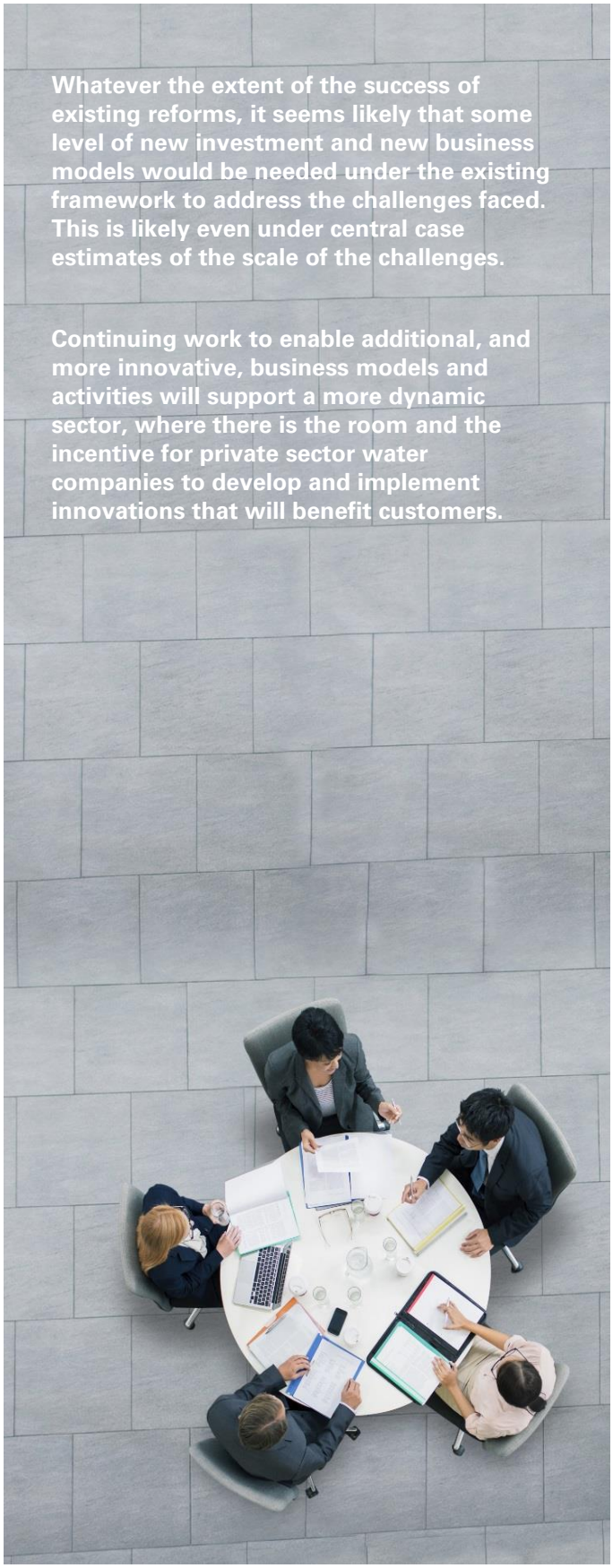


The key implications from this report are set out below.

Key implications	Discussion
Many different types of business model could be beneficial	— Our discussion shows that there are models beyond what is allowed for in the changes underway that could be viable and could generate public benefits. — Some of these new models can promote beneficial change in parts of the value chain where increased competition is unlikely. Some models can promote beneficial solutions across company boundaries and across catchments. — In contrast the vertically integrated regional monopoly structure is not likely to do this.
New models can interact to provide mutual benefits	— The models can interact in ways that increase benefits and support the development of others. In particular the System Operator model supports many other models, in ways that would make them both more likely to be viable and capable of delivering greater benefits.
Structural change can act as enablers of other models	— Each business model that represents a structural change in the market supports the development of many other business models and new business activities. This 'follow on' effect could create a more dynamic marketplace as it has done for example in the case of decentralised energy.
Local, regional and national solutions can exist at different parts of the value chain	— Retail models can develop nationally and there are signs from a range of company announcements that development of a national retail market is underway. — Wholesale models are likely to evolve differently. Wholesale models are more likely to be local or regional in nature and are likely to address specific needs within a water catchment or water resource zone, given the high costs associated with transportation of water and wastewater.
Competition alone is unlikely to be enough to meet the challenges	— Competition in the retail and the upstream segments can create customer benefits. While the benefits of competition will depend on the success of market opening, the early experience with the introduction of retail competition is that it has already stimulated significant new thinking. — At the same time, such measures to introduce competition as currently set out are unlikely to be enough to respond to all of the sector challenges if less optimistic scenarios associated with impacts such as population growth, climate change and demand scarcity play out.
There are precedents for both market-led and structural change, as well as incentives-based change of	— The precedents from other sectors suggest that structural change has often been driven by factors other than the aim to introduce direct competition in all market segments. There is a role for competition to play, but not all the viable alternative models require more business activities open to competition. Alternative solutions can be about new regulatory structures and business groupings which enable and encourage new forms of activity carried out by existing players. — Continuing with the process of information discovery, differentiation of risk and reward between different parts of the value chain, and between water and wastewater would promote conditions where companies and their shareholders may consider structural change because it would be value-enhancing to do so.
A value for water makes some models more likely	— Critical to the development of some of the models is a commodity market in raw water. Without a value for water that reflects changes in scarcity and that can support short and long-term economic price signals, some of the models won't develop or will be of limited benefit. — Many other sectors give strong price signals to indicate to customers and suppliers that fundamental changes of behaviour are needed to keep supply and demand in balance. Water is unusual in not doing so. — Introducing a value for water would, all else being equal lead to bill increases, difficulties created by new ownership rights and affordability issues for those on low incomes. This report has not considered these issues but they would need to be addressed, whether a value for water emerged via market action, or was imposed by regulatory change. — Given that all the signs suggest pressure to invest more will continue into the future, maintaining affordability of bills and customer support for changes will remain key to the ability of the sectors make changes on a voluntary basis.
Greater consideration of the optimal size of operation at each part of the value chain in light of the models identified would be helpful	— Will allowing competition in water resources and sludge promote similar thinking about the optimal structure to that already emerging in retail? If it doesn't, should Ofwat and Government take further action to identify optimal size, or could this be left to the market? And what institutional arrangements would be needed to enable very different optimal sizes and areas of coverage between water and waste water, and in different parts of the country? Again the report has not considered these questions, but the likelihood that new models could emerge at different parts of the value chain shows that there is value in continuing to debate the structure of the industry, and whether more structural change could increase public benefits delivered by the sectors.

2 Introduction

This report is aimed at furthering industry discussion and identifying new thinking on potential business models that could emerge as the structure of the industry changes.

Scope

Changes happening in the law, Ofwat's Water 2020 proposals and companies pursuing voluntary separation in response to retail competition all point to an increasing rate of regulatory change in the water and wastewater sectors.

There have been numerous reports into the sectors identifying challenges and hence a need for change in the industry. For example if the industry is to respond to cost and environmental challenges, meet ever increasing customer expectations and stay affordable for all customers, many of these reports have pointed to the need for new approaches. The measures already implemented via changes to legislation and PR14 provide new degrees of freedom for incumbents and new entrants to respond to opportunities within the sector. Further changes are under consultation by Ofwat, Defra and the Environment Agency that will set the agenda for the next price review and beyond. Changes to business models that are already implied by these proposals include new operators in water resources and bioresources, direct procurement of large projects, abstraction licence trading and more water trading.

The report considers what new business models may emerge against this background of change, using four scenarios for how the industry might develop. It discusses a set of success factors, including sources of revenue and the market the model would address. These factors determine what would be needed to ensure viable business models where private sector owners are willing to contribute capital in the long term.

It also considers the extent to which the new models can help to address the challenges faced by the sector, in particular the extent to which the models can deliver additional public benefits relative to the current vertically integrated supply chains. The ability of new models to create a net public benefit is an important factor. The sector regulators would only consider enabling change if it can create public benefits that are larger than the costs of any change.

Models that are already implied by the changes already introduced or under consideration are discussed only briefly. This is on the assumption that they have already passed a level of examination via the impact assessments carried out by Government and Ofwat. The aim is to focus attention on more innovative models that may emerge.

Structure of the report

Section 3 summarises the challenges and drivers for change that have been set out by a range of industry stakeholders, and the enablers that have already been put in place to help address them. It presents four scenarios for how the structure and regulation of the sectors might develop in future.

Section 4 identifies the scope for new models, the markets they would operate in and the factors needed for a successful new model to emerge. It then introduces a number of innovative models that are the focus of the remainder of the report.

Section 5 discusses how each of three broad groups of model identified can create public benefits, taking into account customer needs such as choice, continuing low bills and service quality, and wider societal needs for resilience and sustainability.

Section 6 uses the scenarios to explore which models are most likely to emerge in different circumstances.

Section 7 shows the interactions between models and how models can mutually re-enforce each other.

Section 8 identifies barriers to entry and risks that would be faced, pointing to the need for further change and openness to innovation from all parties in the sectors.

Section 9 describes the implications of the scenarios and models for the way companies, regulators and the Government might approach the sectors to enable beneficial models to develop.

Details of the models are given in the Appendix.

3 Drivers for change

Many stakeholders in the sector, notably the Government and Ofwat, have identified the challenges faced by the water and sewerage sectors. A range of publications and consultations have for many years been pointing to the future being very different to the past. Enablers for change have already been put in place that can promoting new business models and activities in the water and wastewater sectors.

Responding to change

Extensive change is underway, with Government, the Environment Agency (EA) and Ofwat commencing significant changes to the law, regulation, and the way the sectors are administered. The industry itself is already changing in response to reforms such as the Water Act 2014 and PR14, which have resulted in companies re-structuring into separate retail and wholesale businesses, exiting the non-household retail business and in some cases creating separate management structures around the water and wastewater businesses.

There is nevertheless continuing debate over the scale and importance of the drivers for change, and the best response to them. This section summarises some of the drivers for changes and the responses that Government and regulators have taken to facilitate this change.

Drivers of change

The challenges facing the UK water and wastewater sectors have been documented by a range of industry stakeholders. For example, challenges for both water and waste water are set out in Defra's white paper 'Water for Life' (2011), the Environment Agency's 'A Case for Change' (2011) and the 2013 refresh to the case for change. Ofwat published a series of views on the case for change, with impact assessments during PR14 and Defra published the resilience 'roadmap' in March 2016. The Government's National Flood Resilience Review was published in September 2016.

The challenges result in the likelihood of increased demand for water and wastewater services, with this demand becoming ever harder to meet [(a)]. The drivers of change can be summarised on a number of themes:

- **population growth and per capita demand** with demand growth highest in areas where water is already scarce;
- **climate change and more extreme weather events**, with the Met Office's UKCP09 predictions showing consistently reduced river flows in the summer in most scenarios, and in some scenarios groundwater availability is also reduced. There is also the likelihood of increased winter flooding. Events like this can impact both supply and demand;
- **increasing focus on resilience of water and wastewater infrastructure**, a good example being the recent work sponsored by Water UK. The research modelled the possible effects of climate change, population growth, environmental protection measures and trends in water use to produce a wide range of future scenarios The results suggest that, in some scenarios, we are facing longer, more frequent and more acute droughts than previously thought, with the south and east of England facing a higher risk of more severe droughts than those experienced in the past, while English regions further to the north and west are also more exposed to the prospect of future water shortages[(b)];
- **ever stricter environmental standards**, with significant improvements required to meet the requirements of the Water Framework Directive, and to restore sustainable levels of abstraction;
- **customer expectations and affordability**, with customer's expectations of service levels increasing across a range of sectors and with customers expecting similar service improvements from their utility providers, but with little willingness to support bill increases.
- **intergenerational issues**, where the long term nature of the investments required raises over the extent to which today's customers should pay for benefits that will result in the distant future.

Note: (a) See for example Water Supply and Resilience and Infrastructure, EA Advice to Defra, Oct. 2015 which considers water scarcity and The Government's National Flood resilience Review, Sept. 2016, which considers new approaches to flood resilience

Note: (b) Water Resources Long Term Planning Framework, Water UK, published September 2016.

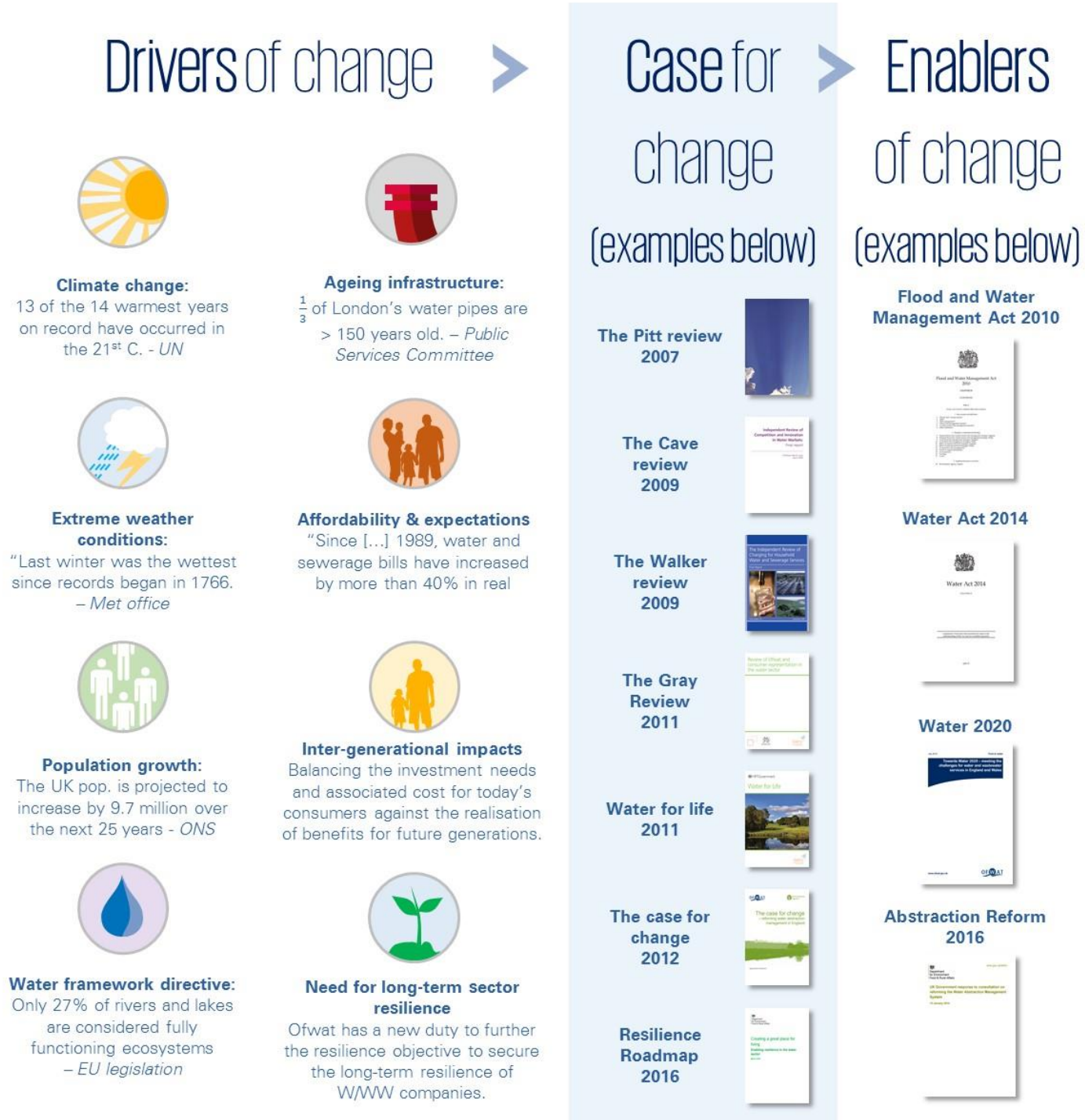
Enablers of change

In response to the challenges, there have already been numerous changes in legislation (e.g. the Flood and Water Management Act 2010 and the Water Act 2014), in regulation at PR14 and subsequently and reforms to the abstraction licence regime. These will act as 'enablers of change' by facilitating changes in the industry and its stakeholders in order to tackle the challenges ahead.

The 2014 Act allowed the development of markets in upstream activities enabling businesses to provide new sources of water or sewerage treatment services and it makes trading of bulk water trades between companies easier. The Act also changed the merger regime, potentially reducing the barriers to mergers that existed previously to changes in industry structure.

In addition, the Act also creates a new resilience duty for Ofwat strengthening its long-term focus in addition to its duties on consumer protection and company financeability. Figure 1 summarises the drivers for change, reports that have made the case for change and some of the enablers that are already in place.

Figure 1: Drivers and enablers of change



Could the challenges be met in other ways?

There is still significant uncertainty on the extent of the impact that these drivers will have on water and wastewater infrastructure, and the speed of the impacts. There are many different possible assumptions associated with population growth, climate change, per capita demand and the likely future direction of environmental legislation. Some of these uncertainties are amplified by the absence of information thus far on how they will be affected by the UK's decision to leave the EU.

As a result of the uncertainty surrounding all the drivers and effects, it is perhaps understandable that there isn't a common view shared by all stakeholders on how the industry should respond. There are obvious ways of addressing scarcity that do not require extensive structural change, such as existing operators making strong efforts to promote water efficiency.

There are a range of actions water companies could take now to address challenges to the supply and demand balance for water. For example, they could reduce leakage further. They could actively promote demand management and metering for households, and increase interconnection within and between networks. The regulatory framework could be adjusted to support such measures to the extent that they do not occur by market-led actions. However if such actions involve extra cost and net increases in bills it could be difficult to secure customer support for such schemes.

Reducing demand through increased metering, reducing leakage and increasing interconnectedness between networks could all play an important role in managing the efficient use of existing water resources, helping to mitigate the risks of unmet demand in future.

Under the existing framework, there is no case to reduce leakage below the level where it is deemed that further costs are uneconomic. There have been limited increases in interconnection between companies despite increased incentives to do so. The cost / benefit case associated with increased meter penetration is challenging for water companies. All these factors suggest that the existing framework may face challenges in making sufficient changes via changes to the supply and demand balance.

The study into long term planning sponsored by Water UK shows that even if companies carry out these measures, they would still need to invest more in water resources in some areas and in some scenarios[(c)].

It would also leave the current industry structures unchanged, with today's water companies responsible for a defined set of obligations for water and wastewater within their areas. They would continue to have limited incentives to consider co-ordinating with other companies beyond their boundaries.

Overall, there is a clear need for future investment in a range of scenarios to increase resilience in both water and wastewater. The recent Government report into flood resilience concluded that 'there are obvious benefits to managing water in a way that reduces both flood risk and water stress, and that delivers wider environmental benefits[(d)].'

Where more investment would cause a rise in bill levels from those of today, the investment requirements will need to be balanced with customer affordability and future bill levels to maintain confidence and customer legitimacy and trust in the sector. All customers pay a share of measures to reduce the impact of scarcity and floods via their bills but these impacts are not distributed evenly over time or across the country.

Further changes seem inevitable and both Government and the sector regulators are continuing with the reform agenda.

Four future scenarios

Looking well beyond the changes Ofwat has proposed for PR19, the future shape of the industry is uncertain and will be dependent on a number of complex and inter-related factors both within the industry and the wider socio-economic and political landscape.

As the degree of uncertainty is high, it is helpful to consider a stylised set of scenarios that cover the range of outcomes that may exist.

The aim is to focus on how the industry may evolve in relation to the drivers for change, and how different scenarios could impact the new business models that could emerge.

Note: (c) Water Resources Long Term Planning Framework, Water UK, published September 2016.

Note: (d) National Flood Resilience Review, HM Government, Sept. 2016.

Figure 2 below describes four potential scenarios and is based on two key dimensions; the extent of market and regulatory reform and the impact of drivers for change such as climate change and population growth where both 'low' and 'high' scenarios exist across each dimension. For example, the impact of the drivers for change could be higher or lower than currently expected, and the extend of change mandated by regulators or Government could be higher or lower than today's expectations. The scenarios are:

— Existing framework "plus"

— Localised new entry

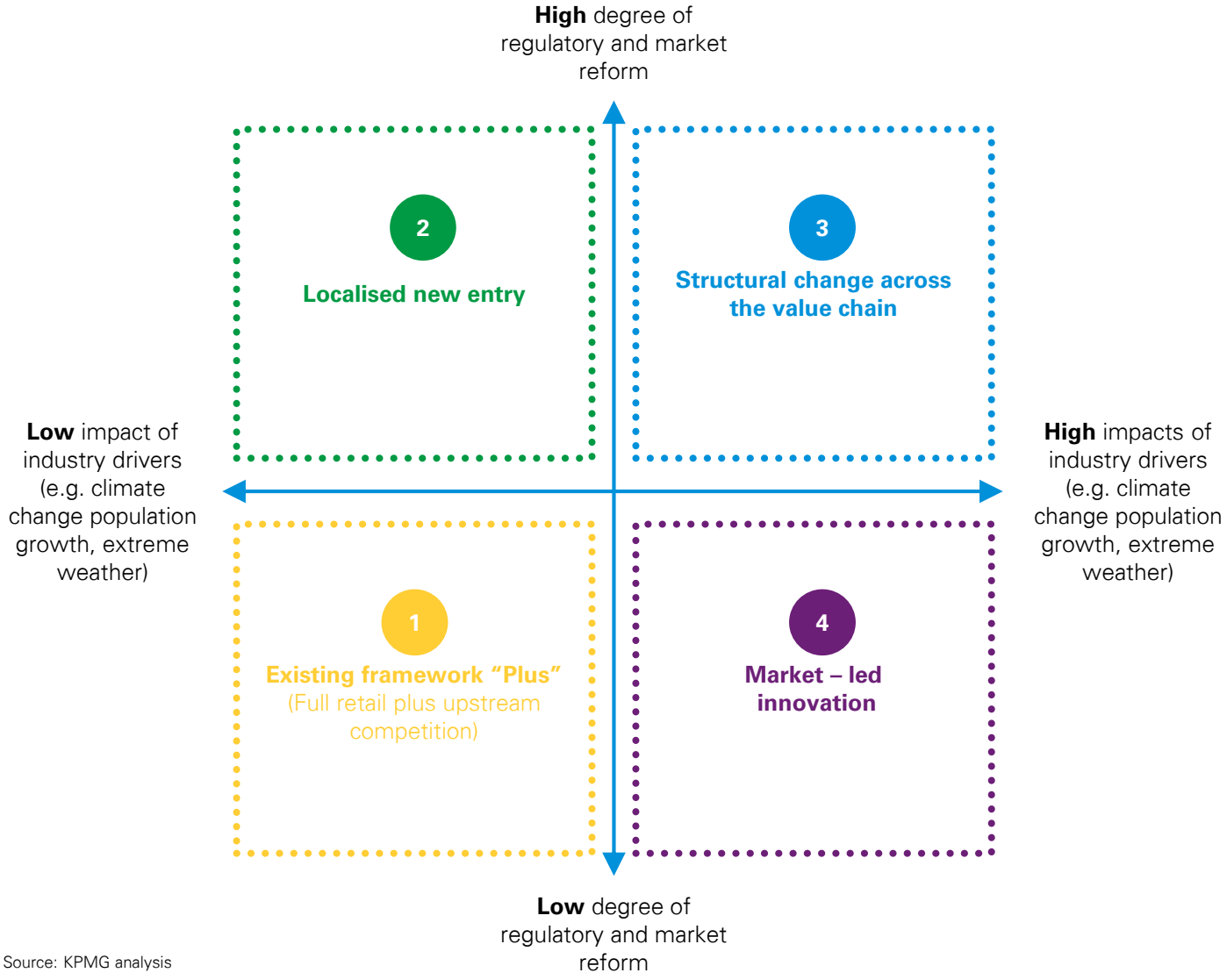
— Structural changes

— Market-led innovation.

These four scenarios have been used with the drivers of change to inform views on the new models that could develop. The next section presents a number of new models, and describes how each could deliver net public benefits.

Section 6 then uses the scenarios to inform views on when each model would be most likely to emerge and deliver substantial public benefits, though many of the models can develop to an extent in all of the scenarios.

Figure 2: Industry scenarios



Source: KPMG analysis

Scenario 1: Existing framework "plus"

In this scenario, the impacts of climate change and population growth do not pose the extent of challenge currently expected as described in our discussion of drivers for change. However the changes already prosed by Ofwat and Government take place. These changes, combined with the rest of the current framework, are found to be largely sufficient in future to address the challenges identified today. A vibrant retail market develops in non-household retail and over-time this is extended to household customers. Multi-utility offerings focused on resource sustainability in water and energy supports significant demand reduction.

As a result, there is less need for more significant reforms and the focus becomes the need to support increasing resilience within the sectors. The opening of sludge and resource markets creates some new market activity. Differentiated regulatory treatment and further separation between water and wastewater services increases value chain separation but vertically integrated utilities remain largely intact.

Scenario 2: Localised new entry

In this scenario there is an improved emphasis in demand reduction, greater consumer awareness and lower than expected impacts from climate change which all lead to the stabilisation of resource scarcity. Under the less constrained supply-demand balance the benefits of new models are less clear. However, Ofwat and Government continue to pursue with a more extensive reform agenda. Acute issues in specific regions allow for targeted market entry by those with the required resources (e.g. supply capacity, innovative sources of financing, water and waste capabilities distinct from those of today's incumbents).

An established and transparent regulatory framework supports investors and new entrants. However there is limited further development of the economic pricing signals that would influence behaviour, such as a value of water. The scope for new entry is limited and focused on specific geographies where local characteristics of supply and demand facilitate entry, and incumbents are also able to realise benefits.

More extensive service separation and differentiated regulatory treatment creates further dis-aggregation of the value chain but the ownership structure of the majority of activities remains the same as today.

Scenario 3: Market-led innovation

The supply-demand gap continues to widen as the impact of increased migration and population growth, coupled with 'worst-case' climate change predictions start to take effect. Consumer demand does not reduce as hoped through retail competition and other measures, and extreme weather creates more severe droughts and flooding than expected, impacting on supply and demand in both water and wastewater. In turn this causes an increase in energy and water prices and the need to increase infrastructure investment to maintain resilience.

Disagreement between industry stakeholders, including companies, Government and regulators, on the appropriate solutions stalls more significant reforms and incumbents innovate to reverse a worsening trend. Companies take a pro-active role in increasing the efficient allocation of resources through initiatives such as increased trading and interconnection across boundaries and asset swaps. These moves help to optimise resource constraints imposed by geographical and licence boundaries, overcoming potential regulatory hurdles. Companies access new sources of funding from alliances with local stakeholders to secure community resources and improving regional co-ordination.

Scenario 4: Structural change across the value chain

As with scenario 3, there are strong impacts from the drivers for change. Market-led solutions fail to develop fast enough and widely enough to meet challenges, so Government and regulators step in and mandate more radical reforms such as introduction of a 'market price' for water as a commodity or compulsory structural change. A value for water emerges in certain times and places and promotes the right economic conditions for the creation of competitive markets and entry across the value chain. Enablers or new obligations are put in place where regulators judge they are needed in all the regulatory frameworks to require structural reform and identification of optimal groupings of services at local, regional and national levels, including across catchments. Unbundling of different parts of the value chain becomes a requirement.

Investment in large scale interconnection increases the scope for pan-regional upstream markets. Ownership fragments across the value chain as investor appetite in the sector changes and owners select attractive segments to retain and / or divest. New entrants and companies must balance commercial needs against the requirement for longer-term investment and resilience.

The multiple regulators and Government agencies in the sectors recognise the need for greater co-ordination and arrange for regulation to enable more extensive structural change, with companies obliged to follow suit.

Both increased investment and a value for water increase the level of customer bills, presenting risks to both customer acceptability and affordability. These effects are partly offset by the benefits introduced by increased competition and efficiency in the market, and customers remain willing to pay for long term improvements. Affordability continues to be a concern, but concerns are adequately met by regulatory or social measures.

4 New business models and activities

We have identified a long list of new business models and business activities using precedents from other sectors and emerging trends in the sector. We have focussed on those that could deliver additional benefits to customers.

This section considers the characteristics of a business model and the factors that are necessary for a new model or a new business activity to be successful and viable. It then presents a number of potential new models that could emerge within the sectors.

Identification of the models has been carried out by considering the industry challenges, trends and drivers already discussed, and drawing on precedents from other regulated sectors

The scope for new business models

Some of the industry challenges can potentially be addressed by incentivising incumbents to perform more efficiently within the existing framework. It is common for regulators to consider productive, allocative and dynamic efficiency and Ofwat via PR14 and Water 2020 has set out via how it is re-focussing the regulatory framework to place more emphasis on the delivery of allocative and dynamic efficiency.

This report does not consider changes that can be delivered by incumbents performing more efficiently within the existing framework. Instead it looks at more innovative models than those suggested by the current framework, where these models could deliver additional public benefits, albeit maybe requiring greater regulatory change than currently planned.

Possible new markets in water and wastewater

Markets in water and wastewater can be assessed by examining which part of the value chain they impact and their geographical nature, that is whether the markets are local, national or regional. A key characteristic for a new business model is whether it will take a share of an existing revenue stream or whether it creates new sources of revenue, via new services.

The part of the value chain affected closely interrelates with the geographic nature of the market. The market could be entirely within an existing company area or span several companies. For example, it could be defined around catchments or other geographies that do not coincide precisely with the current water company boundaries.

In the water and wastewater sectors, upstream activities are generally driven by local geography factors. This implies that business models in the upstream part of the value chains are more likely to be local and limited to areas with specific characteristics, such as where water is available but not currently in use in the public water supply, and near to local demand centres.

For some activities such as sludge treatment, a business model could operate in a regional market, where the size of the market is likely to be determined by transportation costs, making some alternative treatment options uneconomic.

Retail services are an example where the market could be defined on a national level, but in other parts of the value chain industry characteristics make national markets unlikely.

Progress can undoubtedly be made under today's business models where vertically integrated regional monopolies provide the majority of services. But the aim of this report is to test alternative business models that could produce more efficient outcomes, encourage further innovation and increase market flexibility.

What makes a successful business model?

Economic growth and development depends on delivering innovative and beneficial solutions within existing models, or the creation of new business models that identify new services and new sources of value creation.

In essence a business model is about unlocking sources of value, and in order to do so it will depend on a number of critical success factors to be viable in the long term. These factors include a stable and secure revenue stream, access to the relevant resources in terms of physical inputs and access to sufficient financing on economic terms. Another key factor for new models is the absence of restrictions that prevent them. This characteristic is generally true in unregulated markets but in regulated markets there are legal and regulatory restrictions on what is permissible. Such restrictions are particularly relevant in water where environmental and public health requirements play an important role, in addition to economic regulation of monopolies.

A viable business model will need to have some form of competitive advantage which will ensure sufficient demand for the products or services offered in the market. The competitive advantage could be derived from a variety of sources such as a cost advantage delivered through scale, or better processes, or innovation coming from technological developments. A new business model will also need to address some form of market failure in the existing structure, otherwise existing players would be expected to have filled the need.

In this assessment we use the term 'business model' quite broadly to mean something that a company could consider as a market driven activity that is potentially sustainable in the long term as a stand-alone activity.

Potential new business models in water and waste water

We have looked at the key drivers, existing and proposed changes in the water and wastewater sector and precedents from other sectors, particularly but not limited to energy. We have also consulted a number of stakeholders to identify potential future business models in water and wastewater.

We have considered how overall customer benefits may be realised following the introduction of different approaches into different parts of the value chains. Each of the more innovative business models has been assessed by considering:

- the part of value chain affected;
- the features of the business model;
- why there is a missing market or market failure in the existing framework;
- the barriers to entry from a private perspective;
- risks experienced by the operator of the model;
- how a public benefit could arise;
- the extent to which the model addresses challenges faced by the sectors.

The models are grouped into three broad categories The groups are:

- **New forms of retail service;**
- **Changes in the upstream value chain;**
- **Structural changes.**

The full list of potential business models we have considered is shown in Table 1. For completeness it also includes options that are implied by Ofwat's Water 2020 proposals and changes enabled by the Water Act 2014.

The models identified are not all those possible, but a key filter is the potential for these models to create public benefits, as opposed to being in the commercial interests of the owners. A single description is provided in each case, though most could exist in multiple variants. Full descriptions of the models considered are given in the Appendix.

Table 1: Business models identified

	Business model	Description
1. Retail	1. Demand reduction aggregator	A retailer provides retail efficiency services but extends this to aggregating demand reductions, or those who can avoid peak demand times, and sells the service to the incumbent.
	2. Multi-utility retail consolidation	Different utility services are provided to customers in a bundle with water/wastewater services. Economies of scale can be achieved and passed on to the customer.
2. Upstream	3. Flood resilience as a source of water	An opportunity arises from the development of new flood alleviation schemes. At times of significant rainfall, flood water / surface runoff is stored and used to supply the public network. An RCV mechanism could finance such schemes.
	4. Treated effluent as a source of water	A new entrant provides treated effluent directly to existing water companies, an incumbent could self-supply or WoCs could buy this service from WaSCs.
	5. Non-potable water supplier	Non-potable water (e.g. recycled water, rainwater and reclaimed water) can be recycled and used in industrial applications, construction sites, and agriculture and landscape irrigation.
3. Structural change	6. Sewerage only company	A new entrant provides sewerage only services to customers in one or more regions. The model could impact either the whole wastewater value chain or certain parts of it.
	7. Asset and licence area swaps	Companies that share a contiguous boundary agree to exchange assets or service areas to optimise resources and create a mutually beneficial solution for both participants.
	8. Independent system operator	An explicitly created and separately managed SO is a new activity of network and system management beyond incumbents' existing geographic boundaries.
Implied by Ofwat's Water 2020 programme	9. New sources of water to incumbent	A new entrant abstracts water and sells it to the incumbent which treats, transports and supplies the treated water to customers through a local market.
	10. New water to a retailer	A new entrant sells abstracted water to an independent retailer it is connected to via contracts or ownership. The incumbent provides treatment and distribution services via third party access charges.
	11. Alternative sludge treatment provider	A new entrant or a rival incumbent carries out sludge treatment for the incumbent and sells the end products of bioresources (energy from waste, gas to the grid, fertiliser) to a 3rd party.
	12. Direct ownership	An operator other than the incumbent provides design, build and operation services for a new discrete large scale enhancement infrastructure asset, and possibly independent financing.
	13. Water trading	A neighbouring incumbent abstracts and sells raw water to the incumbent. The incumbent treats and distributes the water to its customers via its own network.
	14. Abstraction trading	Abstraction right trading is an enabler for efficient use and allocation of available water, not an activity likely to be carried out in its own right.

Source: KPMG analysis

5 Creating public benefits and addressing challenges

Each of the new business models has been selected because it is capable of delivering additional public benefits in the right circumstances, and can contribute to addressing the industry challenges. The models could develop at different rates and have varying levels of effectiveness in the four scenarios considered.

This section discusses how the new models could give rise to additional public benefits such as lower costs and prices, increased choice and improved resilience and sustainability. The models can contribute to addressing the long term challenges faced by the sectors, of population growth, adapting to climate change, rising customer expectations and continuing pressures on affordability.

Group 1: New forms of retail service

Two new business models are targeted on the provision of retail services. The first is a demand reduction aggregator selling a service to the incumbent, and the second is a multi-utility retail provider, providing a range of utility and communications services, allowing retail consolidation to develop.

The demand aggregator is a retailer that provides retail efficiency services to end customers, but extends this via a technology platform into aggregating demand reductions, and sells the service to the incumbent as a package. The incumbent benefits by experiencing lower demand overall and can defer investment in new resources.

Precedents for both types of retail model exist in other sectors in the UK today, notably energy where the electricity system operator will pay for demand reduction or shifting demand out of the peak. It is usual for electricity and gas to be sold together, and in digital communications the 'quadruple play' is now common[(e)]. There are many examples of retailers such as supermarkets which sell a range of utility and financial services. Water and wastewater services are unusual in being provided by a sole supplier, though the introduction of non-household competition will allow multi-service offerings including water for the first time.

Public benefits:

The demand aggregator would achieve public benefits where the avoided marginal cost of water supplied is greater than the payment made to the retailer. This would result in total costs being reduced and falls in bills. Environmental benefits would result from reductions in absolute or peak demand, and delaying of investment in new sources. This model could also help to identify a value for water, via the emergence of time of day and peak pricing models. A value for water would give strong price signals for consumers to treat water as a scarce resource, and to reduce their demand voluntarily. Introducing a value for water would, all else being equal, increase bill levels initially, with potential impacts on affordability.

The multi-utility retailer would deliver a reduced number of interfaces leading to a lower administrative burden for customers, a potentially improved customer experience, including benefits from "one bill", and improved customer choice. Increased efficiency and cost reduction through economies of scope and scale could lead to bill reductions through lower retail costs.

Addressing long term challenges:

Both models can help with the long term supply and demand balance. The demand aggregator can directly reduce short term demand in times of scarcity and in peak periods. It can also impact the supply and demand balance in the longer term by changing customer perceptions, and making people and businesses more "water conscious" in the same way they are now "energy conscious." Multi-utility retailers could differentiate their services by providing better water efficiency services. Retailers do not experience the conflicts that result from a wholesaler that has apparent incentives to increase demand, rather than reduce it. We note that Ofwat has been aiming to eliminate this undesirable incentive via changes to the existing framework.

Note: (e) The 'quadruple play' is providing fixed line telephony, mobile telephony, broadband and TV on demand from one service provider.

Group 2: Changes in the upstream value chain

Three models operate at the upstream part of the water and wastewater value chains: re-using water stored from flooding or drainage systems, using treated effluent water as a source, and developing local networks of non-potable water where water of drinking quality is not needed.

For newly built facilities, it is possible to arrange for flood alleviation schemes to be considered as a source of water, providing storage capacity can also be provided. At times of flooding or significant rainfall, flood water or surface runoff could be stored and used to supply the public network. SUDS schemes could be designed to provide off-take of water, rather than its return to the environment as at present. Using treated effluent water as a source was identified by the EA as one of the strategic options to increase resilience[(f)].

Non-potable water comes from a variety of sources, including recycled water, rainwater and reclaimed water. Non-potable water can be used in industrial applications, construction sites, and agriculture and landscape irrigation. It requires dedicated supply pipes to transport outside the drinking water supply, and creating re-cycling and storage facilities close to demand for non-potable water.

The 2012 London Olympics made extensive use of non-potable water during construction at the site, and built the UK's first non-potable treatment works, taking water from a waste treatment works and using it for cooling water for a CHP scheme, land irrigation and toilet flushing. This use of non-potable water is not yet common in the UK.

Public benefits:

All these models can introduce new sources of water without needing to identify and invest in new abstraction from conventional sources. New sources of water such as SUDs (Sustainable Urban Drainage Systems) or floodwater storage would reduce pressure on future abstraction in times of scarcity. In addition re-use of water would improve the case for new SUDs and flood resilience schemes, promoting wider resilience and sustainability in both value chains.

In the view of the EA effluent re-use has similar benefits to desalination. It is likely to have most benefit in coastal areas where water would otherwise be lost to the sea, because it would be discharged downstream of any available abstraction points. Indirect re-use happens in an unplanned way today by discharge of water into rivers followed by re-abstraction. This increases treatment costs as both discharge and abstraction must be treated. Alternatives could reduce net costs, and this would benefit customers via lower bills.

Although not widespread in the UK, there are examples of re-use of effluent water being fed directly into the water supply in the USA, the Mediterranean, East Asia, Australasia and other countries [(g)].

Non-potable water is transferred via a direct link to the customer's premises without any unnecessary treatment. This model frees up capacity in treatment plants and the incumbent's distribution network. It also ensures water available for use for the public water system is reserved for its highest value uses, where drinking water standards and public health genuinely are essential criteria.

Addressing long term challenges:

Each of these models has a role to play in improving sustainability and resilience. Re-using water from flooding and drainage could improve flooding resilience and sustainable drainage and would assist in addressing water scarcity.

Co-ordination of new schemes where flood and drainage water could be stored and re-used in the water supply would maximize benefits to both sides of the water and wastewater value chains. Re-using effluent and increasing the use of non-potable water for industrial purposes and toilet flushing reduces the need for new sources of supply. Use of non-potable water also improve the allocation of scarce resources by preserving drinking water for uses that need that quality standard.

Group 3: Structural changes

Three models represent significant structural change from today's vertically integrated regional monopolies in both water and wastewater. The first is a "sewerage only company" specialising in wastewater services in one or more of the existing licensed areas, in one or more parts of the wastewater value chain. The second is asset and licence area swaps to optimise delivery of services across a catchment that does not co-incide with company boundaries. The third is an independent system operator that optimises short and long term supply and demand balances across different company boundaries and catchments.

In all cases it is assumed that these new structures and models could be the result of voluntary actions driven by commercial benefits being shared with customers, rather than change imposed by legislative and regulatory requirements.

Public benefits:

A sewerage only company would deliver public benefits if it could operate at lower cost via increased management focus and specialisation relative to today's structure. This could be the case within the existing framework if the introduction of separate price controls and new company structures resulted in increased focus and innovation, but the model assumes these effects are greater if the company provided only one service. There is at present no analogue in waste of the 'water only company, apart from the Tideway Tunnel, though where a WOC operates each WaSCs is effectively a sewerage only company already.

Note: (f) Water supply and resilience infrastructure, EA advice to Defra, October 2015. The other options were de-salination, storage, bulk transfers and demand management

Note: (g) See e.g. Effluent re-use study, phase 1. MWH for the Environment agency, May 2007.

New entrants or new arrangements between today's incumbents would allow optimisation of sewerage services across company boundaries. Ofwat's Water 2020 proposals allow for the introduction of competition to the bioresources segment of the waste chain, but leave the rest of the waste sector unchanged.

Swapping assets or licence areas for both water and wastewater could deliver better and more efficient allocation of resources, leading to cost savings and / or improved service. There are numerous places where company boundaries do not co-incide with catchments. While there has been some consideration of the optimal size of operation in water or waste water[h], there has been relatively little structural change in the sectors. Swaps would provide significant benefits in areas where existing boundaries are sub-optimal and constrained. Asset swaps would enable more efficient allocation of resources, improving supply/demand challenges and support improved management of catchments and/or water resource zones.

It is notable that the structure of the waste sector is unchanged since privatisation, whereas the water sector has experienced more change, via consolidation between WoCs and WaSCs buying WoCs.

An Independent System Operator (ISO) can help to achieve lower costs in network and system management and contribute to improved allocation of, and sustainable use, of water resources. While the idea has been under debate in water since market and structural reforms began following the Cave, Walker and Pitt reviews, there has as yet been no incentive for companies to explicitly create an SO, and still less for one that can optimise across company boundaries.

Addressing long term challenges:

The structural changes involved in a sewerage only company could make incremental improvements in the management of individual areas in waste water. Assets swaps could do the same for both water and wastewater. Such changes would contribute to addressing scarcity, population growth and adapting to climate change, but probably at a lower levels than the new models considered so far.

An ISO would be an enabling mechanism for addressing challenges and the size and nature of the benefits would depend crucially on the remit, incentive framework and remuneration created for the ISO.

On the other hand, the industry clearly faces two considerable problems in responding to long term challenges. One is the very limited lack of optimisation across company boundaries today[i]. The other is the limited considerations of optimal scale and area of location in either water or wastewater since privatisation. While the number of WoCs has reduced slowly since privatisation due to acquisition, and this trend continues with the purchase of two WoCs announced so far since the conclusion of PR14, the number of WaSCs is unchanged and there has been virtually no change to the underlying company boundaries[j].

The evidence from the introduction of retail competition, and the resulting number of announcements of joint ventures and retail exits shows that an external stimulus may be needed to promote structural change in the wholesale value chain.

Introduction of an ISO in an area could realise many of the benefits of optimisation across a catchment in water, without the need for extensive boundary changes between today's licensees. An ISO working across company boundaries would itself be a considerable structural change, but the potential benefits from its introduction are shown by the continuing debate on whether, and if so how an ISO in water could be implemented.

Note: (h) See for example Pollitt, M.G. and Steer, S.J (2011) Economies of scale and scope in network industries: Lessons for UK water and sewerage sectors, EPRG Working Paper.

Note: (i) Water trading is an exception but it has not increased significantly as a proportion of total supply since privatisation. The other exception is early developments of a market in sludge disposal, where studies identify there is some innovative market activity already underway, even if of a limited extent.

Note: (j) Again, there is an exception, where the New Appointment and Variation regime (NAV) allows entrants to provide water and sewerage services or water only services for a defined area in place of the existing appointed water company in that area. As a model for competition it is likely to be superseded by the introduction of full competition in the retail non-household market

6 The conditions for new models to emerge

In our view all the models described are capable of generating public benefits in the right circumstances. Earlier we described four scenarios reflecting the extent and pace of development of the drivers, and the degree of institutional change beyond that already proposed. Here we discuss which models are most likely to emerge in each scenario.

The scenarios described in section 3 are:

- Existing framework "plus"
- Localised new entry
- Structural change
- Market-led-innovation

Regulatory reform required

The dimension of institutional and regulatory reform refers to the extent of regulatory interventions implemented in the future. Changes could be required of Ofwat, Defra, the EA, Natural Resources Wales and the DWI. In some cases, for example abstraction reform and water trading, reforms need to be co-ordinated and carefully aligned to maximise the scope for public benefits. The existing companies or entrants would need to be supportive of such changes and would need to see private benefits in addition to public benefits, in order to be willing to act voluntarily to develop some of the new business models proposed.

The current legal and regulatory framework limits the number of new models that could emerge. In particular the vertically integrated structure of the legislation and the licence places a range of obligations on companies for all the services they supply. These vertically integrated obligations make it difficult for companies to restructure outside the parameters already set by the existing regulation. Even though they can outsource activities entirely, for example via Ofwat's new "Direct Procurement" route, the obligations remain with them.

Future challenges and external drivers

The dimension of future challenges and external drivers refers to how climate change, population growth and other factors might evolve and impact the water sector in the future, and whether they develop to a greater or lesser extent than is expected today.

These two dimensions have been used to develop the scenarios, and the models have been considered against each scenario. The results are shown in Figure 3 on the next page.

The position of the business models in the matrix should be interpreted as the combination of circumstances when the model is most likely to evolve and be successful. Business models on the right hand side of the matrix are more likely to evolve if climate change and population growth have large impacts on the sectors, as the need for solutions offered by these business models is much greater under these circumstances.

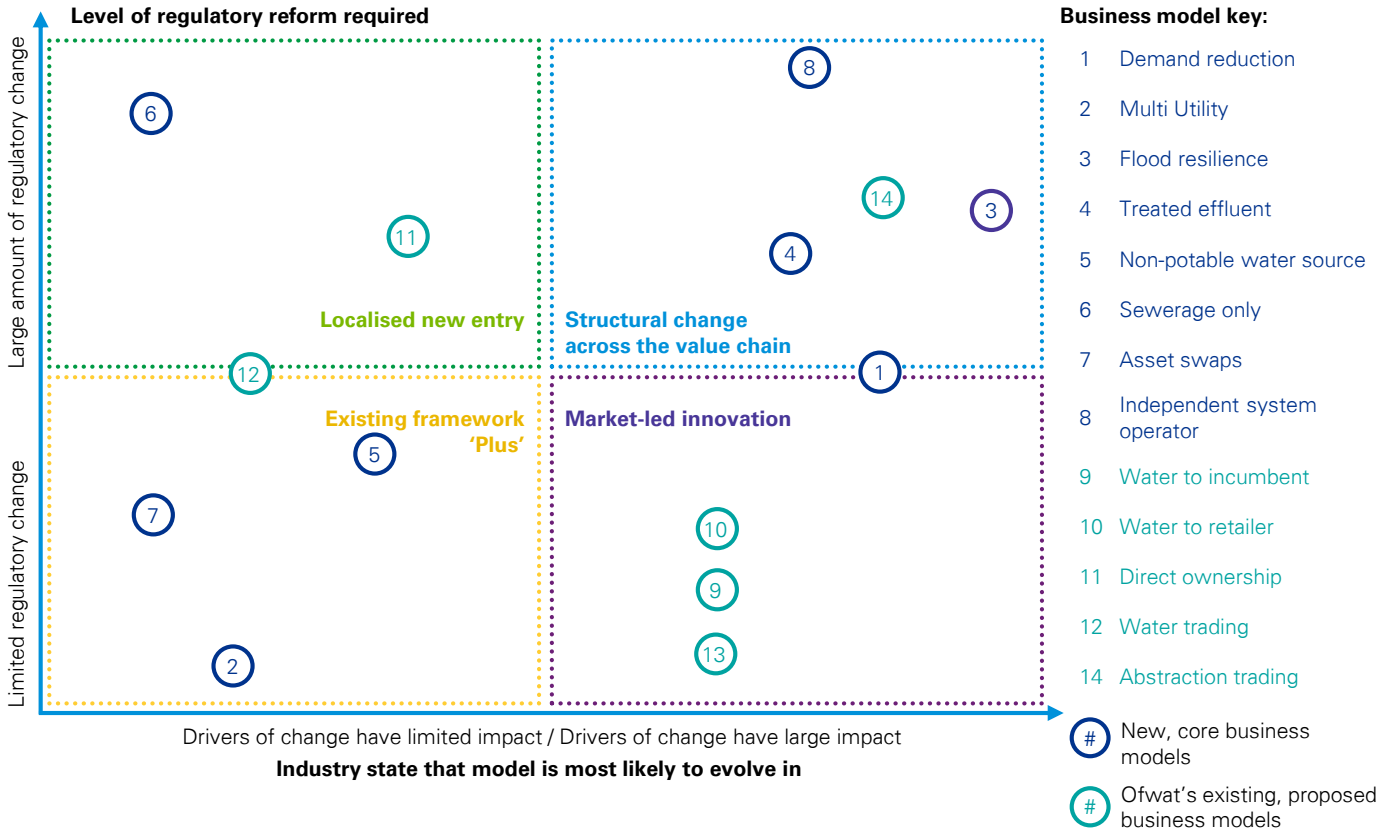
Meanwhile, business models positioned towards the left hand side of the matrix provide solutions for situations characterised by less extreme circumstances, which do not require chronic supply-demand imbalances in order to develop.

The vertical axis indicates the level of regulatory (and / or legislative) change needed, if the models are inhibited by the current frameworks. As an example, a retail multi-utility service provider needs hardly any regulatory change once the retail market is open (and water incumbents could do this today, by adding other utilities to their existing offers). A new entrant to water that is already providing other utilities services (gas, electricity, telecoms etc) is only required to obtain the respective water retail supply licence from the regulator.

On the other hand, the system operator needs to be enabled by complex regulatory changes to the existing framework if it is to be paid for out of existing regulated revenue. It would only be possible through substantial changes to the existing licences and operating models of the incumbents and the retail entrants that are already preparing for non-household market opening in 2017.

Both the system operator and the multi-utility model could also develop where the impact of climate change and population growth is lower than expected. The impact of drivers for change and the scope and scale of regulatory change influence how likely particular models are to emerge and be successful. But no model is ruled out if the future turns out to follow one scenario more than another.

Figure 3: Circumstances where different models will develop.



Future scenarios:

Localised new entry: Climate and population growth do not impact as predicted, but significant market reform is implemented.

Structural change across the value chain: climate change and population growth predictions emerge, but regulatory intervention has successfully created a sufficiently resilient market.

Market-led innovation: Worst case climate change and population growth predictions emerge, companies respond positively and so reform is more constrained .

Existing Framework "Plus": Climate change and population growth do not impact as predicted and extensive reform is limited

It is notable that for all four of the scenarios considered, there are new models that are most likely to develop in that scenario. This indicates that there will be new business models that will be viable and present opportunities in most circumstances. This is the case whether the industry challenges have a higher or lower impact than expected today, and whether is a greater or lesser degree of regulatory change.

There are models that require both higher and lower levels of regulatory reform, including ones that require little or no change from the level of regulation today (e.g. water trading and the multi-utility retail model). It is not the case that new models can only develop if there is extensive further reform.

There are many more models than those implied by the changes already introduced by Ofwat and Government. Our identification is not exhaustive, and many of the models described have numerous variants. As a result we conclude that there is a large scope for new models to develop in the water and wastewater sectors.

7 Relationship between the models

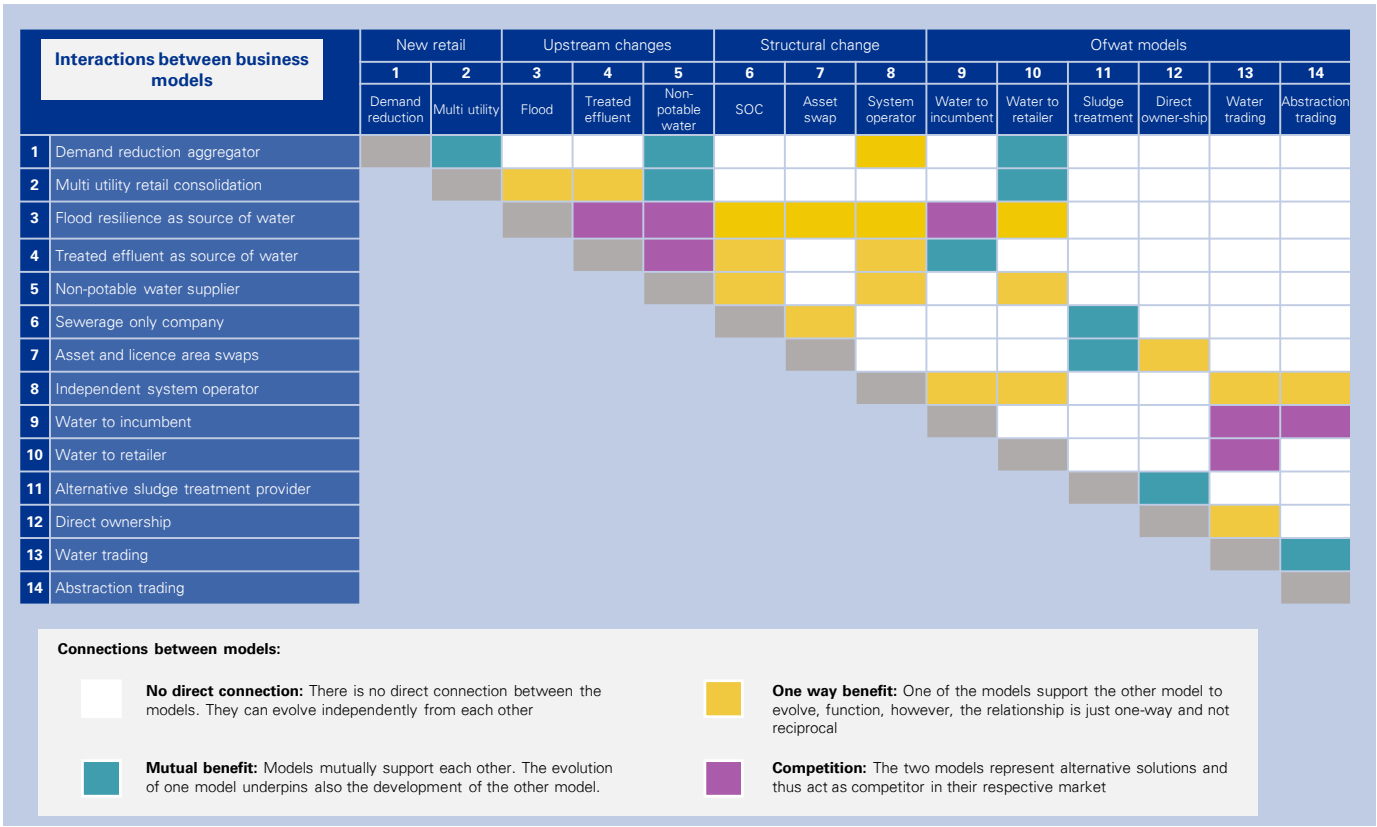
The discussion so far has considered new business models in isolation. In future, business models will operate not in isolation, but by interacting with each other. Different pairs of models could compete with each other, re-enforce each other or be independent of each other.

Different pairs of models can interact in a number ways. They could compete with each other; they could mutually re-inforce each other ("mutual benefit"); the existence of one model could make another more likely to emerge and / or deliver greater value ("one way benefit"); or two models could operate independently of each other.

Figure 4 provides a summary of how the business models interact with each other in a schematic way. Reading across a row, the colour codes show the connections between pairs of models.

For example, the first row shows all the connections for the demand aggregator model. There are mutual benefits between this and the multi-utility model, as demand aggregation would be supported by innovative retailers, and innovative retailers would have an interest in offering water efficiency services to customers. Demand aggregation would result from accumulating such savings, and identifying customer who could avoid peak demand.

Figure 4: The relationships between models



Source: KPMG analysis

Most other models can operate independently of a demand aggregator. The presence of a system operator would provide a one way benefit to the demand aggregator. A system operator with an obligation to look for ways to reduce long term demand would be another potential buyer for the services of a demand aggregator, whereas there is no benefit in the other direction that makes the system operator more likely.

An example of where models would compete would be flood resilience measures as a source of water and an independent water resource supplier, as enabled by the Water Act 2014 and Ofwat's Water 2020 proposals. In both cases, the immediate customer for water is the incumbent wholesale supplier, and its interest is in buying new water sources at lower marginal cost than self-supply, regardless of the type of new supplier it buys from.

A number of clear patterns can be seen by examining the interactions. These patterns show that overall, there are groups of models that re-enforce each other, either mutually or where the presence of one model makes another more likely.

Mutual benefit between upstream changes and new retail services

In general, business models that introduce new water sources via changes in the upstream value chain have a mutually supportive relationship with business models targeting new retail service offerings. New retailers are likely to be interested in alternative sources of water. New sources increase the options and parties retailers have to source water and so improve the chances of retail market entry.

Similarly, new entrants in the retail segment can serve as alternative sources of demand for new water source providers. This is how the two models mutually reinforce each other.

Competition between new water sources

New water sources would all be supporting existing and new demand from the customers of the incumbent or of a new retailer. While multiple new sources of water can help to address supply and demand in times of scarcity and add resilience, all new water sources will to some extent be in competition with each other, as well as in competition with the incumbent.

Structural change models as enablers of other models

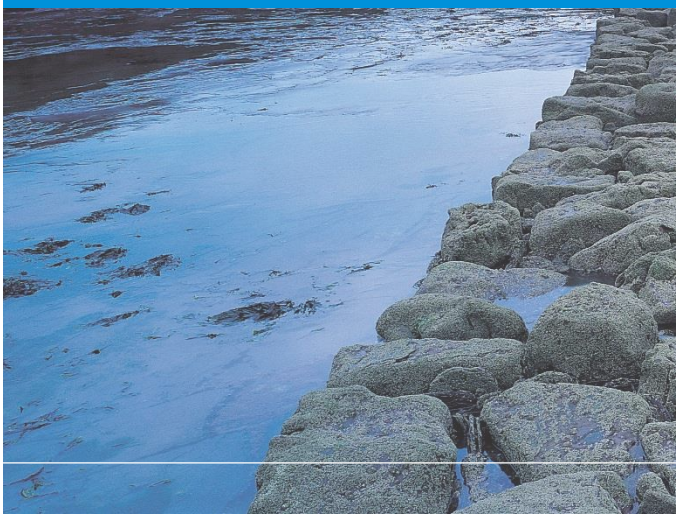
Each business model that represents a structural change in the market supports the development of many other business models.

The sewerage only company supports the evolution of business models in the wastewater value chain. The independent system operator helps business models to operate which require the transport of water and thus impact the network part of the value chain. The asset and licence area swaps can encourage the development of business models involving large assets, such as increased interconnection or development of new supply and storage facilities.

In particular, the system operator model provides support to many of the models identified in the water sector, emphasising its importance. Each of the relationships between system operator and other models show that the models receive a one-way benefit if a system operator is present. System operators acting across company boundaries or managing a single catchment will not evolve in response to market demand under the current institutional arrangements, and the limited incentives on the existing market players.

It is possible that some models could have unintended adverse consequences with developments that are not in customer interests, requiring regulatory intervention. Such effects have not been explored in this report.

The mutual benefits and interactions between the models suggest that public benefits would be higher if multiple new models exist together. This points to the need to consider how overall market dynamics can be promoted by both companies and regulators.



8 Barriers to entry and model development

Each of the new business models will inevitably face some barriers to implementation where an entrant or an existing player is considering an innovative position to address a perceived market gap, but might, at the same time, face an existing market failure. The barriers can be divided into three broad types: regulatory or legal barriers, upfront investment costs and the need for new commercial and contractual relationships.

Regulatory and legal barriers

Regulatory and legal barriers are presented for a number of the models. For example, fully separable licences are required for the multi-utility model, and new forms of licence would be needed to enable sewerage only companies to operate. The presumption against re-use of effluent water would need to be reversed in order for it to be supplied as a water source. Another common feature is the lack of sufficient incentives on incumbent companies to introduce certain changes voluntarily.

With vertically integrated licences and the governing legislation presuming end-to-end service provision, the industry must always be aware of the requirement to meet all the obligations place on it. The Tideway Tunnel and the WSSL licencing regime are examples of new forms of licence that depart from the vertically integrated structure, but unless there is a complete rethink of the way legislation and licensing works, the most likely options that will develop will be smaller variants within a framework where today's structure largely persists.

There is little incentive for adjacent water companies to co-operate to create a pan-regional system operator. Each would be ceding control of its network whilst retaining extensive licence obligations to provide water in its own area. It is possible that price controls could be so tight that neighbouring companies were compelled to co-operate to meet cost targets, but this is yet to happen. Similarly, a demand aggregator would be unlikely to be able to sell demand reduction as a service unless it was clear how the regulatory framework would treat this extra cost, and how the framework would provide incentives for the water company by benefitting from reduced demand, rather than experiencing only a revenue loss.

A number of the new models would require co-ordination from multiple regulators in the sector, particularly in the case of the use of new sources of water such as treated effluent, or using excess flood or drainage water as a source. This would add complexity and cost to the decision to enter the market. Creating a new manged market is not straightforward, as the development of retail codes running to thousands of pages illustrates.

Upfront investment

Most of the models require a degree of upfront investment, against a background where the market for the service is either in development or speculative. New sources of water will require investment in abstraction facilities and interconnection to existing networks. Further development of non-potable water requires the construction of dedicated networks and the matching of available sources with local demand that does not require drinking water quality.

Investment in technology platforms and customer management systems would be necessary in the case of the aggregate demand, provide multi-utilities, building storage or interconnection between networks, or new networks themselves (non-potable water).

Asset or area swaps to optimise the management of a catchment or region would require the identification of common interests, the valuation of the respective assets and a balancing payment to reflect any difference in the agreed value of the assets being exchanged.

New commercial relationships

In general the models require a reliable and long term source of revenue in order to be viable. In some cases, for example the demand aggregator, this would be creating new sources of revenue. In other cases, the new model would be competing for a share of existing revenue stream, such as those models that provide a new source of water to an incumbent. In these cases the revenue for the new business would be a cost to the incumbent and would be funded out of revenue from bills.

In the case of the system operator there would need to be a new regulatory arrangement for how the system operator would be funded and financed, as revenue would need to be provided by the price controls. In the majority of cases, the model would depend on the willingness of the regulator to change the regulatory framework. It would only be willing to do this where the costs and benefits clearly showed that it would result in net public benefits.

Risks faced by entrants

In addition, the new models could face significant risks once in operation. Unlike incumbent water companies they would not in general benefit from a regulatory framework that contains risk mitigation and risk sharing mechanisms that help to manage risks faced by existing operators.

Likely risks for each model are case specific and as with other features, details are given in the Appendix. Examples of risks faced by the models include a challenging commercial model. For example the demand aggregator would be seeking both to identify savings for its retail customers, and to package this demand in a way that it could be used as service by the existing operator

Not only could the incumbent carry out this activity with its own customers if it had the incentive to do so, the system operator does not exist yet in water as an independent intermediary between the network and the customer. This example illustrates that new business models frequently face new and hence less well understood risks than companies operating in the current market structure.

Another risk faced by a number of models is the strong position of the incumbents. This is particularly true for innovative sources of supply, where the only likely customer for the service will be the incumbent water company. Some of these models could only be viable if the incumbent either voluntarily entered into agreements because of net benefits to itself, or if the regulatory framework obliged it to do so.

Approaches that promote more innovation

Limitations in the existing regulatory frameworks

The current structure of vertically integrated regional companies may not address all the challenges described in the scenarios described in this report and elsewhere. It is also possible that the changes already introduced will not, on their own, produce enough solutions that can respond to the highly local and regional nature of the sectors.

Until PR14, the existing regulatory framework had changed relatively little since privatisation. Whilst it had been successful in attracting investment and improving customer service. Ofwat responded to the reports into the sector discussed in our section on Drivers for change by beginning to re-design the framework but major changes are likely to occur only once every five years, because of the way the 5 year price cycle is set. Existing company boundaries and limited interconnectedness across regions is likely to act as a barrier to optimisation of local resources. The current framework and the changes introduced by the Water act 2014 and PR14 have yet to result in significant increases in interconnection and cross-boundary trades.

Multiple regulators in the sectors have different duties and agendas for change, areas of responsibility that overlap both in terms of aim and geographic responsibility. The regulatory landscape and change agendas for water and wastewater from each regulator are complex.

It is unlikely that some of the models identified will emerge without further institutional and structural change. The existence of barriers to entry and risks once in operation indicate that some of the models may not emerge unless they are directly incentivised by changes to the regulatory framework, or more direct forms of structural change.

Structural change in other sectors

Utilities in many sectors are undergoing fundamental changes, including re-organisations, restructurings, changes to the institutional and regulatory frameworks and significant structural change. It is helpful to consider structural changes that have taken place in similar regulated utilities and the lessons learned when considering how the water industry may evolve in ways that meet industry challenges.

The original motives behind privatisation of the utility sectors were typically to fix sustained underinvestment in the networks, to improve often sub-standard customer service, and to use competition and regulation to drive efficiencies in the sectors.

Frequently, the industries were privatised as monopolies, for example BT, BAA, electricity transmission and distribution and gas, all began as monopolies, albeit with very different vertical structures. For example electricity already had separate companies carrying out transmission and distribution, whereas gas was fully vertically integrated.

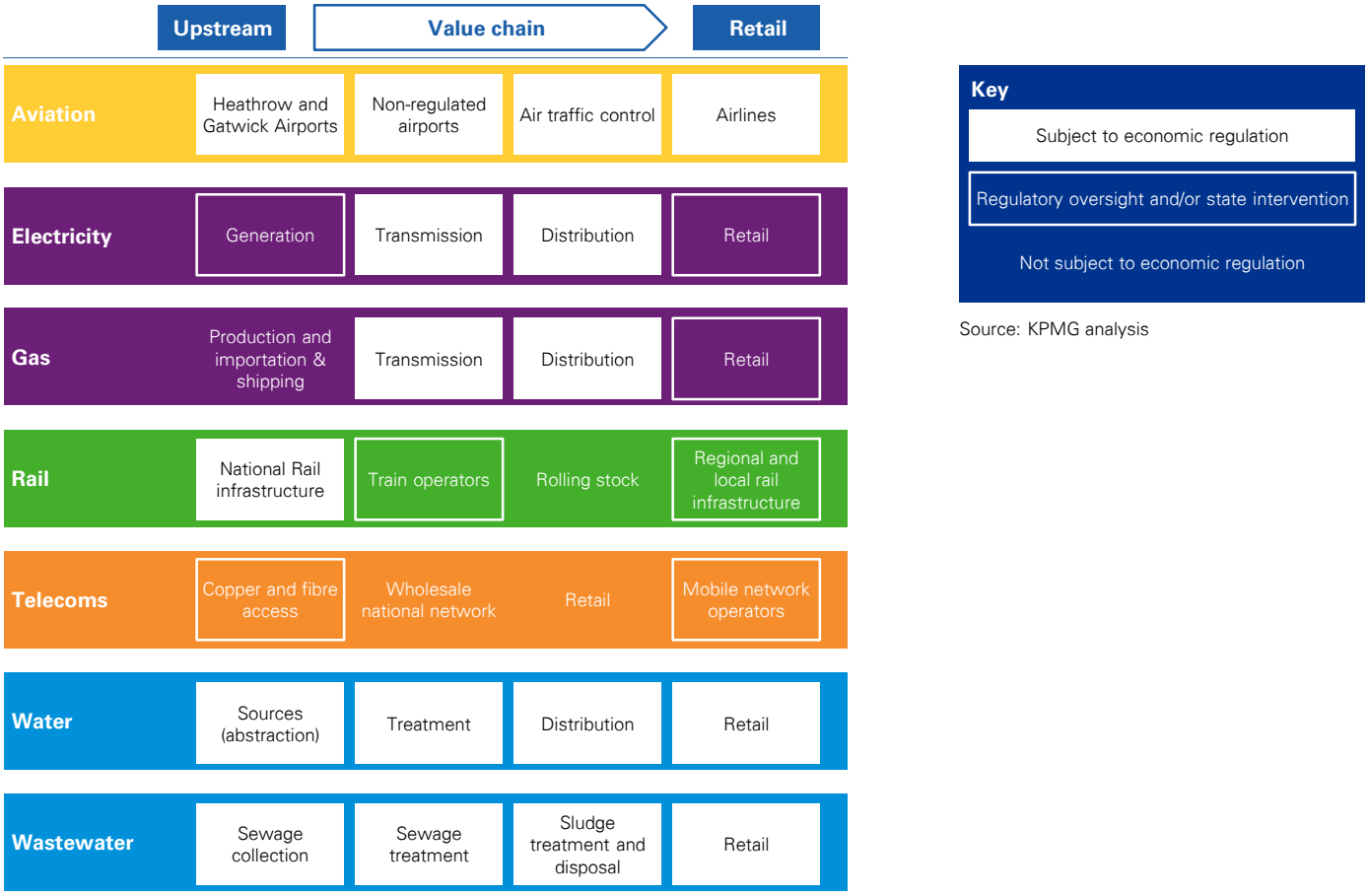
These industries have experienced a high degree of structural change since privatisation. For example, BAA has been split into new groupings of airports, there have been extensive changes to the operation and ownership of electricity and gas, including the system operator in electricity and gas being under common ownership. Openreach now has a strong form of operational separation from the rest of BT, imposed by Ofcom as an alternative to mandatory separation and the break-up of BT. This model is now moving to legal separation.

A key lesson learnt from the development of other regulated sectors where regulatory and legal changes have introduced competition is that much of the structural change has been as a result of intervention by policy makers, and was not a market-driven response to customer needs.

There is value in more competition within the existing framework for water and wastewater, but there is also a role for changes to the regulatory and policy frameworks to promote new models and new approaches, whether they involve competition or not. This is particularly true in water, because of the multiple agencies that make and regulate policy, and the presence of many stakeholders, including users and potential suppliers of water and wastewater services. Many of the stakeholders in water are not subject to economic regulation provided by Ofwat.

Figure 5 gives an indication of which previously integrated monopoly sectors are subject to different levels of regulation. Unlike most other regulated utilities, the privatisation of water and wastewater was not accompanied by any major structural or market reforms.

Figure 5: Regulation in different sectors



Source: KPMG analysis

Source: UK Regulated Infrastructure – An Investor Guide, UKRN, December 2014

Water and wastewater are, by nature, different to a number of the other utilities and generally require far higher capital investment in order to maintain the network. As a result, the cost of the network is a far higher percentage of the overall cost of water and wastewater services than the transmission and distribution networks are for electricity[(k)]. Many parts of the value chains are also less likely to be amenable to competition than in some of the other sectors.

Because of these effects, competition in the industry has been limited to date, and may always have a limited scope in some parts of the value chain. Along-side this, there is a relatively low value placed on water and waste services by consumers, transportation costs are relatively high, there are limitations in network connectedness, and there is an absence of a commodity market and pricing signals.

As demonstrated in the table above, reform that encourages competition ultimately aids the move towards reduced regulatory control. In some cases, however, it is clear that competition reform has had limited results in delivering structural change, notably in rail.

It is important to consider the development of market mechanisms and new structures alongside the introduction of competition. Removing barriers to entry and allowing a new entrant into a market that already exists is an example of competitive reform, whereas introducing a new system operator role is an example of market mechanism reform. Both types of change should be considered in order to establish solutions that can address and target the specific industry challenges.

Note: (k) Industry structure issues in the water and wastewater sectors in Australia, Abbott and Cohen, May 2010.

9 Implications of the models

Further regulatory and legislative reform and willingness from companies and investors to explore new opportunities is likely be needed to facilitate the development of new business models in the future.

Many different types of business model could be viable

Our qualitative analysis shows that there are more (and potentially many more) models that could be viable and could generate public benefits than are implied by Water Act 2014 and PR19 changes announced to date. The implication is that further changes to the regulatory frameworks of all the regulators of the sector would enable more models to emerge.

Some of these new models can promote beneficial change in parts of the value chain where more competition is unlikely, due to the economic barriers from duplicating investment in water networks. Some models can promote beneficial solutions across company boundaries and across catchments.

In contrast the vertically integrated regional monopoly structure is not likely to do this, having seen very little change since privatisation, and given the incentives on the existing companies to manage only within their licence area boundaries.

Models can interact to provide mutual benefits

The models can interact in ways that increase benefits and support the development of others. In general, business models that introduce new water sources via changes in the upstream value chain have a mutually supportive relationship with business models targeting new retail service offerings. New retailers are likely to be interested in alternative sources of water. New sources increase the options retailers have to source water and from different parties and so improve the chances of retail market entry. Similarly, new entrants in the retail segment can serve as alternative sources of demand for new water source providers.

Structural change can act as enablers of other models

Each business model that represents a structural change in the market supports the development of many other business models. The sewerage only company supports the evolution of business models in the wastewater value chain.

The independent system operator helps business models to operate which require the transport of water and thus impact the network part of the value chain. The asset and licence area swaps can encourage the development of business models involving large assets, such as increased interconnection or development of new supply and storage facilities.

In particular, the system operator model provides support to many of the models identified in the water sector, emphasising its importance.

Local, regional and national solutions can exist at different parts of the value chain

Retail models can develop nationally and there are signs from a range of company announcements that development of a national market is underway.

Wholesale models are likely to evolve differently. Wholesale models are more likely to be local or regional in nature and are likely to address specific needs within a water catchment or water resource zone, given the high costs associated with transportation of water and wastewater.

It is unlikely that a national business model will emerge in the wholesale value chain but replication of local solutions may develop in multiple geographies where similar characteristics exist.

Competition alone will not be enough to meet the challenges

Competition in the retail and the upstream segments can have significant customer benefits, and the early experience with the introduction of retail competition is that it has already stimulated significant new thinking from water companies and others about how to create successful business models and how to organise in response to the change. There is every likelihood that the introduction of competition into water resources and sludge treatment will also result in a range of new thinking and new approaches.

But such measures to introduce competition alone will not be enough to respond to all the sector challenges if they develop as the stronger scenarios suggest. For example, introduction of sludge competition in the waste water value chain does not imply any additional ways of responding to the need for resilient flood defences.

Similarly the introduction of water trading incentives and market codes will not by itself address the increasingly widely recognised problem that catchments are not managed in an integrated way, optimising the resources devoted to water use, drainage and the environment's needs.

There are precedents for both market-led and imposed structural change

The discussion shows that those models that require significant structural change are capable of supporting and enhancing the benefits of a range of other models, rather than each model existing independently of others. Asset swaps or exchanges of licences areas, a greater focus on wastewater as a sector in its own right and the system operator are all examples that can enhance other models.

In those parts of the value chain that are exposed to competition, there will be direct pressure on companies and their investors to consider how to optimise their business models.

The precedents from other sectors suggest that structural change has often been driven by factors other than the aim to introduce maximum competition. There is a role for competition to play, as demonstrated by the changes introduced in the Water Act 2014 enabling some forms of upstream competition.

But not all the viable alternative models require more markets open to competition. Alternative solutions can be about new regulatory structures and business groupings which enable new forms of activity carried out by existing players.

Unless it is clear that private and public interests are in conflict and that public benefits are being adversely affected, regulators, the Government or the CMA do not impose far reaching and mandatory change, as the costs can be high and future benefits are uncertain. In addition, there is the need to maintain stable frameworks to attract long-term investment at the low costs of capital that UK utility sectors typically enjoy.

Reducing the residual barriers to support increased opportunities for change of ownership in parallel with further separation of the value chain will support the development of new business models. Investors with different capabilities and/or a different appetite for risk could select the segment of the value chain (e.g. water resources, waste network management, sludge transport) which they consider most attractive and where they can differentiate themselves through competitive advantage.

Continuing the process of information discovery, differentiation of risk and reward between different parts of the value chain, and between water and wastewater would promote conditions where companies and their shareholders may voluntarily consider structural change because it would be value-enhancing to do so.

A value for water makes some models more likely

Critical to the development of some of the models is a commodity market in raw water. Without a value for water that reflects changes in scarcity and that can support short and long-term economic price signals, some of the models won't develop or will be of limited benefit.

Many other sectors give strong price signals to indicate to customers and suppliers that fundamental changes of behaviour are needed to keep supply and demand in balance. Water is unusual in not doing so.

A value for water won't emerge in the short-term, given the current direction and pace of change. There is a likelihood that without direct and co-ordinated action by the various regulators, it will not emerge even in the long-term.

Some measures are currently underway that aim to allow the value of water to emerge, such as increasing the role for abstraction trading and water trading, Ofwat's Abstraction Incentive mechanism (AIM) and allowing new suppliers of water access to the existing water networks.

Introducing a value for water would, all else equal lead to bill increases, difficulties created by new ownership rights and affordability issues for those one low incomes. This report has not considered these issued but they would need to be addressed, whether a value for water emerges via market action, or is imposed by regulatory change.

Greater consideration of the optimal size of operation in light of the models identified may be beneficial

The introduction of retail competition allows both retail entry and retail exit. These changes have already resulted in a range of announcements from companies preparing to do both. Over time, it is likely that retail consolidation will occur, since retail activities are normally assumed to have economies of scale. A competitive retail market could allow the optimal scale of retailers to emerge without further regulatory action.

In contrast, while there has been some analysis on the optimal size of company is in the wholesale market, there does not appear to be a general consensus on whether the optimal size differs between water and wastewater, whether it differs at different parts of the value chains or indeed whether there are large scope economies between them

Will allowing competition in water resources and sludge promote similar thinking about the optimal structure to that already emerging in retail? If it doesn't, should Ofwat and Government take further action to identify optimal size or could this be left to the market? And what institutional arrangements would be needed to enable very different optimal sizes and areas of coverage between water and waste water, and in different parts of the country? Again the report has not considered these questions, but the likelihood that new models could emerge at different parts of the value chain shows that there is value in continuing to debate the structure of the industry, and whether more structural change could increase public benefits delivered by the sectors.

Appendix: Descriptions of new business models and market activities

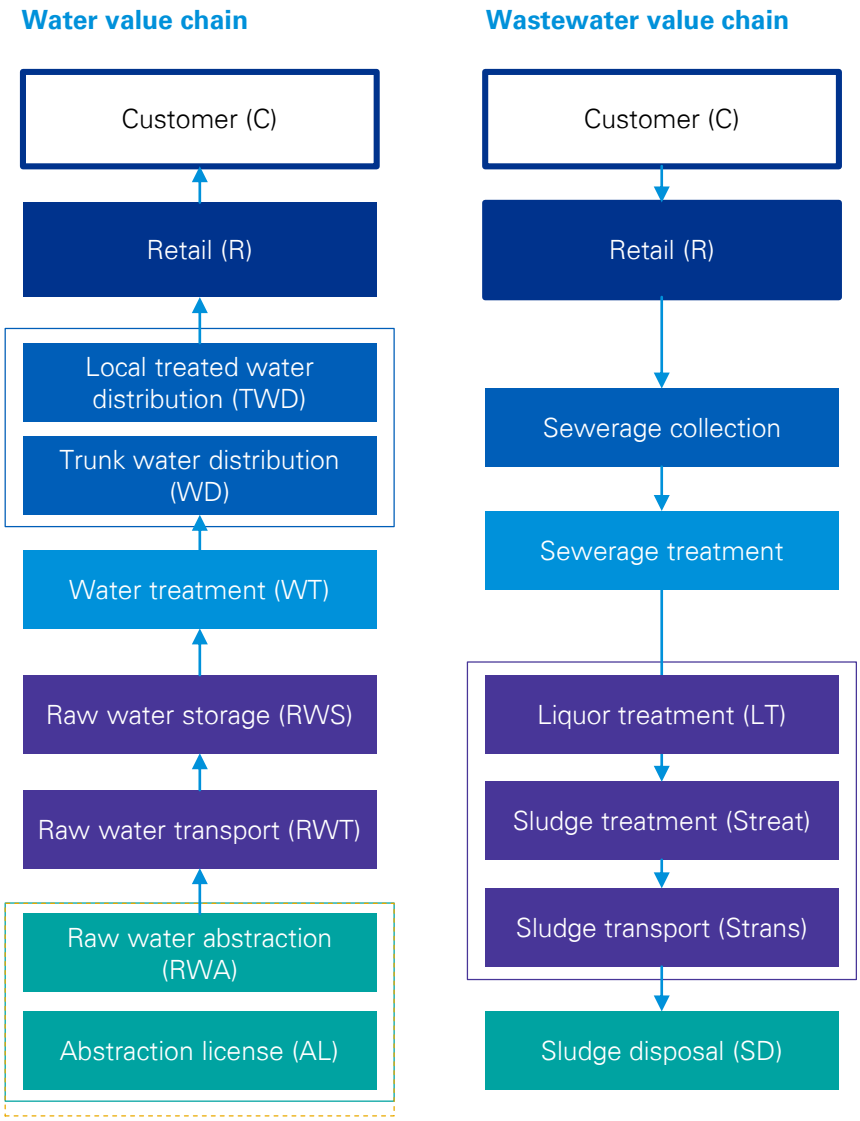
Each model description has a description of the key features, the barriers to market entry or implementation, the risks faced by the market entrant or adopter, how public benefits could arise, and how a model could help to address industry challenges.

The first group of innovative models focuses on the retail portion of the value chain.

The second group of innovative models focus on the resources segment of the water value chain. The new sources are offtake from flood defences, treated effluent and developing local networks for non-potable water only.

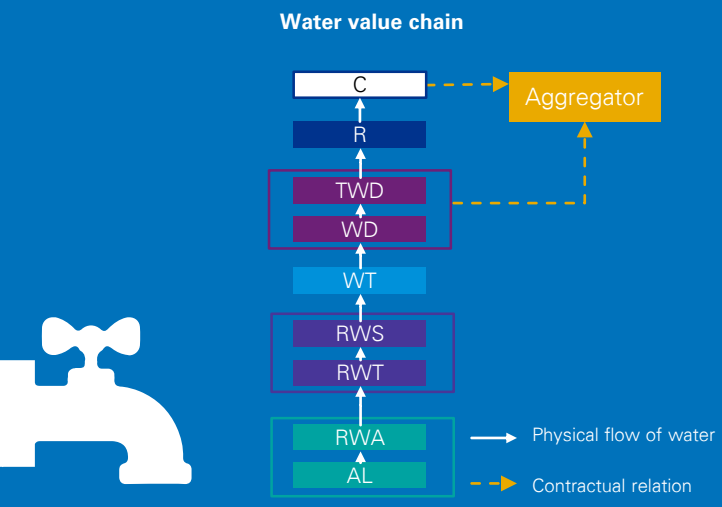
The third group is based on structural change, and include a sewerage only company, asset and licence area swaps and an independent system operator. In the right circumstances, these new models could operate where existing company boundaries or sizes are suboptimal.

Figure 6: Key to model diagrams



Source: KPMG analysis based on Ofwat's accounting separation classifications

1 Demand reduction aggregators



Key messages

- Customers become actively involved in managing the supply-demand balance.
- Precedents from the energy sector show there is a role for demand aggregators to package up innovative ways of reducing demand or shifting demand across time and selling the service to network companies.
- This model is promoted if an independent system operator exists.

Features of the business model

- A retailer provides retail efficiency services but extends this to aggregating demand reductions, for those who can avoid peak demand times, and sells the service to the incumbent.
- Precedents from electricity in the UK exist today, where the SO will pay for demand reduction or shifting demand out of the peak.

Barriers to market entry

- There is no contracting framework between retailers and incumbents.
- The demand aggregator will need a technical platform that can capture demand in defined areas and on efficient scale.
- There is little incentive in the current framework for incumbent to reduce demand because of the impact on wholesale revenue.
- Household metering requires high levels of penetration nationally for the aggregator to operate in the consumer market.

Risks faced by market entrant

- Given there are limited investment requirements financial risk of new entry is relatively low.
- The main risk of a new entrant is related to the challenge of identifying a revenue stream and its potential volatility, and creating the necessary multi-party contractual arrangements.

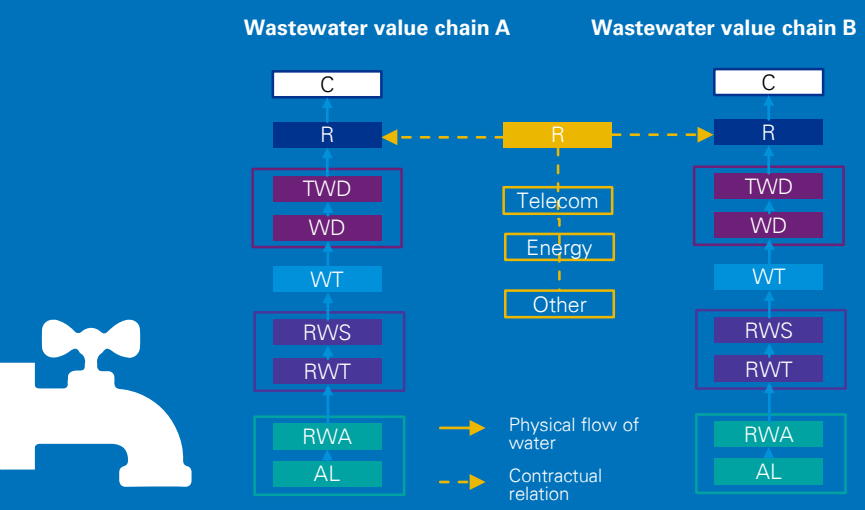
How could a net public benefit arise?

- Where the avoided marginal cost of water supplied is greater than the payment made to the retailer, total costs are less.
- Environmental benefits would result from reductions in absolute or peak demand.
- This model could help to identify a value for water, via the emergence of time of day and peak pricing models.

Challenges of the water sector addressed

- The model assists with short and long term problems of demand in times of scarcity and in peak periods and impacts the underlying balance of supply and demand by changing customer perceptions.

2 Multi utility retail consolidation



Key messages

— Providing many services through a single retailer can generate economies of scope and scale and deliver customer benefits via lower bills, higher levels of service, and improvements in efficiency of obtaining essential services.

— Examples are common in other sectors such as communications (triple and quadruple plays) and electricity and gas.

Features of the business model

— Different utility services are provided to customers in a bundle with water and / or wastewater services.

— This model has the potential to attract entrants from a broad range of sectors, including existing energy utilities, brand retailers such as supermarket chains and digital communication companies. Water companies could move in the opposite direction.

Barriers to market entry

— As water retailing is a licensed activity a new entrant will need to fulfil the licensing requirements of Ofwat, and the household market is not yet competitive. Any future opening up the household segment for competition will increase the scope of this business model.

— Multi-utility retail activity is dependent on effective access to the wholesale market, a multi-utility billing capability and multi-utility customer service capability system and supporting infrastructure where development in technology may help new market entry.

— A new entrant may need to overcome some mistrust coming from of public perceptions of problems in the competitive energy market.

Risks faced by market entrant

— Customer bad debts, customer churn and revenue loss.

— Technology platforms and complexity of multi-service offerings.

How could a net public benefit arise?

— The reduced number of interfaces leads to lower administrative burden for customers and improved customer experience, including benefits from "one bill", and improved customer choice.

— Increased efficiency and cost reduction through economies of scope and scale.

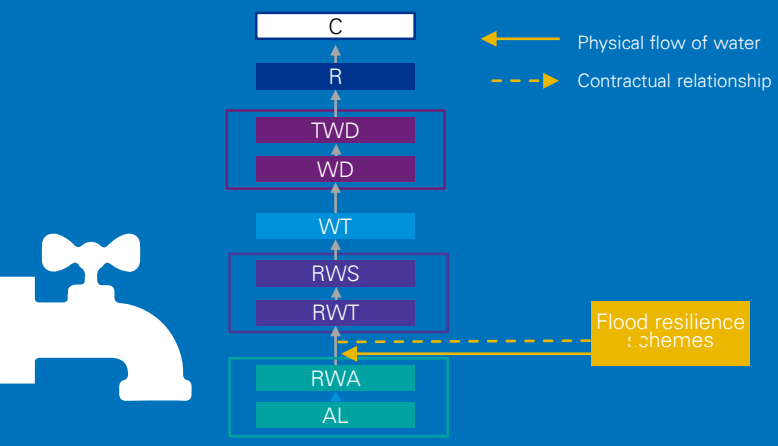
Challenges of the water sector addressed

— Promotes the development of innovative customer service offerings.

— Retailers providing consumers with water efficiency advice and support as a service would reduce water consumption, helping to address water scarcity.

3 Flood resilience schemes as a source of water

Water value chain



Key messages

— More frequent and more serious floods represent a fundamental challenge to the industry, creating risk and costs

— There is an opportunity to transform the thinking and turn floods occurring at one time into an opportunity to address scarcity at another time.

— Ability to store water is key to developing this model.

Features of the business model

— There is an opportunity for the development of new flood alleviation schemes which could also be considered as a source of water.

— This could help ensure that, at times of flooding or significant rainfall, flood water or surface runoff is stored and used to supply the public network, displacing water taken from other sources.

— The upfront design of drainage and flood schemes to allow re-use enables the transfer of water from times of excess to times of scarcity.

— SUDS schemes could be designed to provide off-take of water, rather than its return to the environment as at present.

Barriers to market entry

— This would require careful consideration and planning between those involved in flooding resilience schemes, other parties responsible for flood prevention and defence and existing water companies.

— Responsibilities for flood defence and drainage are spread across many parties, including water companies, the EA, Highways England and others.

— This would require extensive storage to be built which could be costly. Financing challenges could be addressed via funding sources in local communities.

Risks faced by market entrant

— Volatility of supply and demand based on weather patterns.

— Quality and quantity of flood water uncertain.

How could a net public benefit arise?

— New sources of water such as SUDs or floodwater storage would reduce pressure on future abstraction in times of scarcity.

— Re-use of water would improve the case for new SUDs and flood resilience schemes, promoting wider resilience and sustainability.

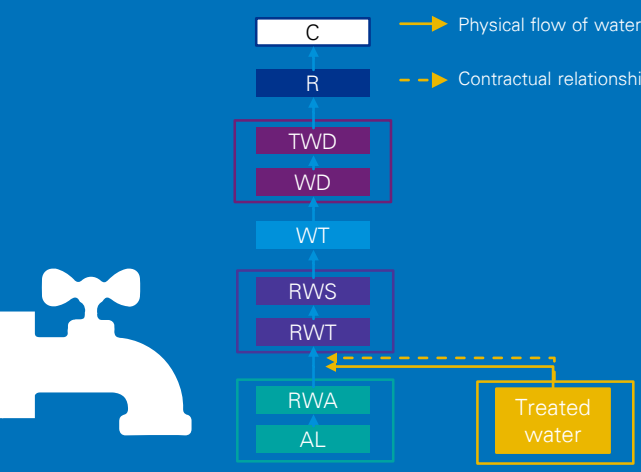
Challenges of the water sector addressed

— This model enables both flooding resilience, sustainable drainage and resource scarcity challenges to be addressed.

— Co-ordination of new schemes maximize benefits to both sides of the water and waste water value chains.

4 Treated effluent as a source of water

Water value chain



Key messages

— Linking the discharge of clean water from the sewerage system to the water value chain would fundamentally change the dynamics of the industry.

— Effluent re-use has similar benefits to desalination. It is likely to have most benefit in coastal areas where water would otherwise be lost to the sea.

Features of the business model

— Both the water and wastewater value chains are impacted. A new entrant provides this water source directly to existing water companies, an incumbent could self-supply or WoCs could buy this service from WaSCs.

— This model could be applied nationally with one or more companies offering the service anywhere that local and site specific conditions allow solutions.

Barriers to market entry

— Transferring water to the public network instead of discharging to the environment will require a consent from the EA and a consent from the DWI, especially if re-use increases. There is a 'presumption against re-use due to perceived higher health risks.' Indirect re-use is seen as more acceptable due to perceived dilution and mixing properties of rivers(I).

— A new entrant will need to have access to an appropriate treatment plant for re-using wastewater, a physical connection between water and waste water networks and possibly storage facilities. There will be upfront investment costs and issues to address on ownership of water and rights to use it.

Risks faced by market entrant

— Variations in quality of effluent would impact on effective treatment.

— A water quality incident could impact on customer trust.

How could a net public benefit arise?

— Effluent re-use has similar benefits to desalination. It is likely to have most benefit in coastal areas where water would otherwise be lost to the sea. Indirect re-use, which happens in an unplanned way today, increases treatment costs as both discharge and abstraction must be treated.

— There are examples of re-use of effluent directly into the water supply in other countries.

Challenges of the water sector addressed

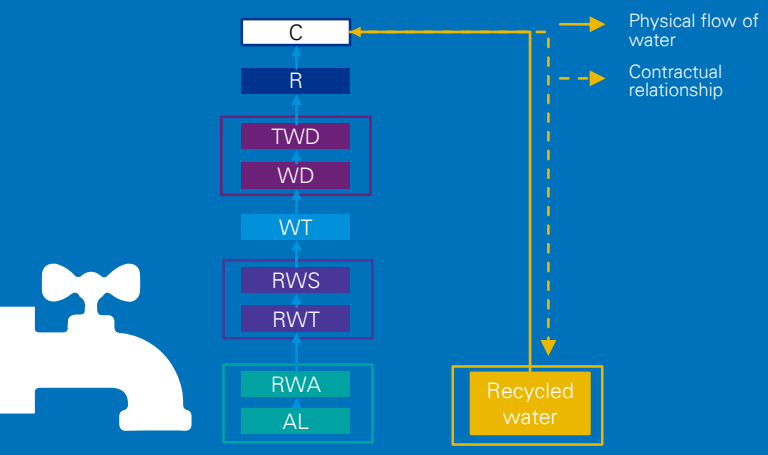
— The model reduces the need for new sources of supply, increases resilience of the water value chain in times of scarcity.

— It can be tailored to locations where there are specific supply constraints, and the environment can support the reduced flow of water back into the river.

Note: (I) Water supply and resilience and infrastructure, EA advice to Defra, Oct. 2015.

5 Non-potable water supplier

Water value chain



Key messages

— Identifying opportunities to re-cycle and re-use water can reduce pressure on the drinking water supply and address increasing scarcity.

— Lower customer bills would result from avoiding unnecessary treatment costs and preserving the available capacity of exiting drinking water networks where human health requires it.

Features of the business model

— Non-potable water comes from a variety of sources, including recycled water, rainwater and reclaimed water. Non-potable water can be used in industrial applications, construction sites, and agriculture and landscape irrigation.

— It requires dedicated supply pipes to transport outside the drinking water supply, or creating re-cycling and storage facilities close to demand for non-potable water.

— The 2012 London Olympics made extensive use of non-potable water during construction at the site, and built the UK's first non-potable treatment works, taking water from a waste treatment works and using it for cooling water for a CHP scheme, land irrigation and toilet flushing.

Barriers to market entry

— There is a need to transport water via a direct physical link to customers' premises or the location of re-use.

— Attaching a value to water could aid new entrants to make large capital intensive investments, improving commercial viability.

— Increased flexibility in abstraction rights would support new market entry.

Risks faced by market entrant

— Financial risks related to potentially high investment costs

— Uncertainty over security of supply and demand.

How could a net public benefit arise?

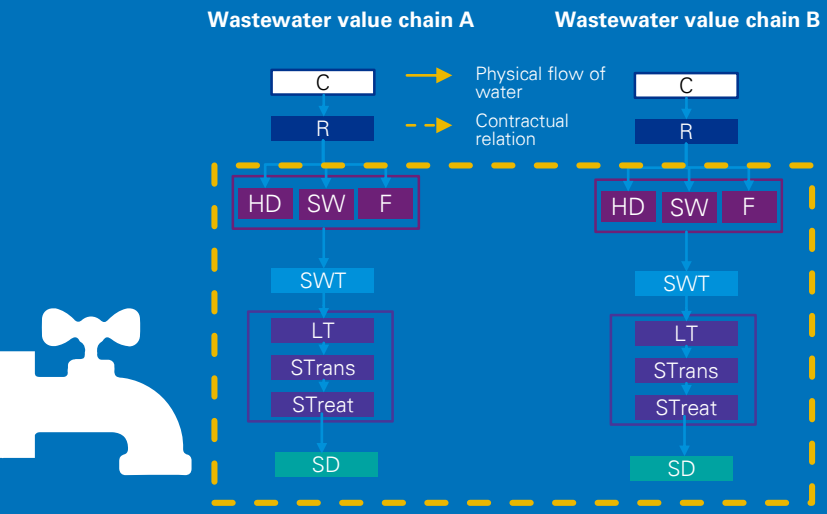
— As water is transferred via a direct link to the customer's premises without any unnecessary treatment this model frees up capacity in treatment plants and the incumbent's distribution network.

— Water available for use for the public water system is reserved for its highest value uses, where drinking water standards genuinely are essential.

Challenges of the water sector addressed

— The model addresses water scarcity as it supports a better allocation of resources, differentiated by water quality offering local solutions in places with large users of non-potable water.

6 Sewerage only company ("SOC")



Key messages

- The focus on the retail business resulting from competition has shown how introducing markets can lead to new thinking on structure and ownership.
- A company that focuses only on wastewater in a region could deliver improved efficiency through better targeting of delivery and incentives to outperform.
- The structure of the sewerage sector is unchanged since privatisation whereas water has seen more change.

Features of the business model

- A new entrant provides sewerage only services (e.g. no water services) to customers in one region.
- The diagram shows regional consolidation between two sewerage only companies, but it could exist as a stand-alone model. The model could impact either the whole wastewater value chain or certain parts of it, and the model could have regional variations.
- New developments could use this approach directly. For existing capacity voluntary de-mergers would be needed to create it.

Barriers to market entry

- Existing areas are all served by WaSCs so there is there is limited scope for new entry.
- There may be economies of scale and scope in providing water and sewerage services together that outweigh the benefits from increased focus that would result from the increased focus created by separation.
- Significant organisational changes and regulatory change would be required.

Risks faced by market entrant

- An untested model in the UK would create uncertainty among investors, though the example of the Tideway Tunnel shows it is possible for sewerage only companies to exist in the right circumstances.
- Wastewater networks are more fragmented than water, increasing operational complexity.

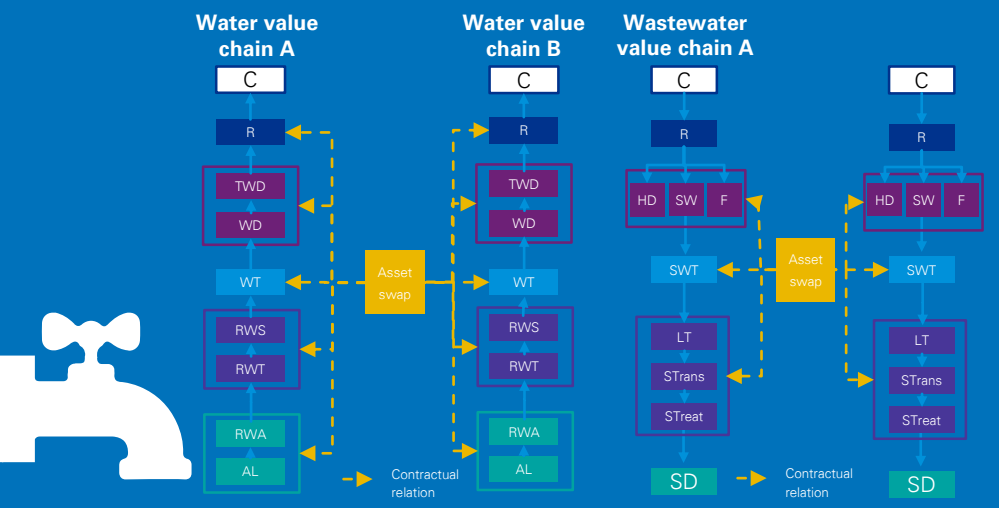
How could a net public benefit arise?

- Operation at lower cost and greater efficiency via increased management focus.
- Optimisation of sewerage services across company boundaries.

Challenges of the water sector addressed

- This model has potential to address the challenges of the water sector as it enables new innovative models and solutions to evolve by supporting coordination, optimization and creativity in the market.
- The model provides an opportunity to improve customer experience and reduce bills through economies of scale if a SOC operates across existing boundaries.
- It promotes the development of innovative customer service offerings.

7 Asset and licence area swaps



Key messages

- Exchange of neighbouring assets or neighbouring licence areas can better align company boundaries with catchments and water resource zones.
- Asset swaps could redress sub-optimal boundaries present since privatisation.

Features of the business model

- Companies that are likely to share a contiguous boundary agree to exchange assets or service areas to optimise resources and create a mutually beneficial solution for both participants.
- Swaps may be applied to all forms of assets including customers, operational plant licenses and network and geographical areas. Payments from one party to another would redress any agreed differences in value.
- For example, it may be that a company's customers are closer to another company's treatment works it could be more efficient solution for the adjacent company to provide a supply rather than the incumbent. For water only companies, there may be wastewater assets that are located within their water service regions that they can run more efficiently than if they are located on the edge of a WaSC's service geography.

Barriers to market entry

- Mutually beneficial arrangements and contractual terms will require parties to align views of the associated value transfer.
- Uncertainty or disagreements about efficiencies need to be overcome before voluntary trades could occur.
- Ofwat will need to be convinced that the transfer is in the best interests of customers, with licence adjustments required for both parties.
- Companies that have whole business securitization structures in place may have \additional restrictions on transfer of assets outside the securitization ring-fence.

Risks faced by market entrant

- Lack of customer confidence that they would see a gain in addition the parties carrying out the swap.
- Multiple agency consent is likely to be required.

How could a net public benefit arise?

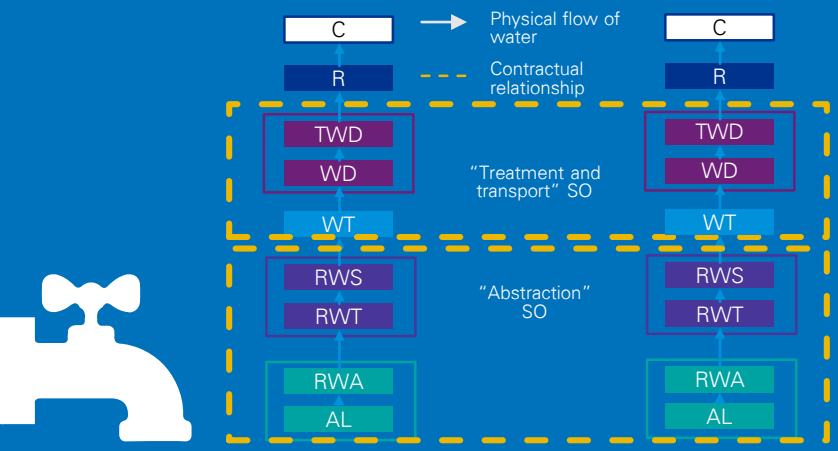
- Delivering better and more efficient allocation of resources leading to cost savings or improved service.

Challenges of the water sector addressed

- The model provides significant benefits in areas where existing boundaries are sub-optimal and constrained by enabling more efficient allocation of resources, improving supply/demand challenges or ensuring improved management of catchments and/or water resource zones.

8 Independent system operator

Water value chain



Key messages

- The SO could be a dynamic player optimising short and long term supply and demand balances across the boundaries of different companies and catchments.
- The SO is an enabler supporting a number of new models.
- The SO can give price signals that will encourage development of a value for water.

Features of the business model

- An explicitly created and separately managed SO is a new activity of network and system management beyond incumbents' existing geographic boundaries.
- The version described does not own physical assets (a "thin" SO) but matches supply and demand, optimising for marginal cost and availability, without involving the ownership of physical assets allowing for both local and regional operation.
- There are many potential variants that differ in scope, regional coverage, remuneration mechanism and time horizon for optimisation.

Barriers to market entry

- Existing companies would need to give up control of key aspects of network management and sources of supply so they little incentive to commence voluntarily.
- Extensive licence changes would be required for all companies.
- The market and regulatory framework would need to be developed to ensure the SO could operate across multiple companies, or with a catchment.
- Development of appropriate remuneration and incentivisation for the SO without adverse impacts on customer bills.
- Challenges in identifying optimal regional coverage and differing network and telemetry capabilities with the networks of adjacent companies.

Risks faced by market entrant

- Financial risks are relatively low provided that the SO is built into the regulatory framework (i.e. the costs and revenues are covered within the regulatory framework and the network companies and the SO are both adequately funded.)

How could a net public benefit arise?

- This business model can help to achieve lower costs in network and system management and contribute to improved allocation of, and sustainable use, of water resources.

Challenges of the water sector addressed

- The optimisation benefits could be substantial if applied in all areas of existing or future water scarcity.
- It also facilitates other new models in the upstream value chain with regard to abstraction and catchments. In the longer term it can facilitate or commission demand reduction, and give price signals to aid identification of the optimum region-wide location for new sources to be developed.
- The SO can contribute to the development of a value for water, via scarcity and regional pricing differing over time.

Business models enabled by ongoing market and regulatory reforms

The business models implied by Ofwat's Water 2020 proposals and enabled by the Water Act 2014 are also part of our long list of potential business models identified which could address the industry challenges. They include:

- A competing company providing water resources directly to the incumbent or indirectly to a new retailer;
- An alternative sludge treatment provider, which provides treatment and disposal services to the incumbent;
- Direct ownership of large assets, where new forms of ownership and financing are introduced for large new assets;
- Water trading between incumbents; and
- Abstraction rights trading between those with a direct interest in water use.

As the changes that enable these models are either already implemented or are actively under consultation, they are described at a high level only, focusing on the key features of the model, the main barriers to market entry and the potential for a public benefit to arise.

9) Competing water resources provider to incumbent

A new entrant abstracts water and sells it to the incumbent which treats, transports and supplies the treated water to customers. The market is local as it is limited to where water not currently in use is available, and near to treatment works. There are businesses other than WoCs and WaSCs that have or could have abstraction licenses such as brewers, industrial process owners and farmers, but there is no market for them to act as independent water resource providers to supply the incumbent.

A key barrier to market entry is the lack of a physical link between the new source of water and the incumbent's network. This causes high entry up-front investment costs. The entrant would need to obtain consent from the EA to transfer water to the public network and potentially from the DWI, and meet the 'no deterioration' requirements of both. The new entrant will need to conform to the proposals set out in Defra's developing views on reforming the abstraction licence system(m).

A net public benefit can arise if the total costs of the new entrant are less than the marginal cost of the next lowest cost alternative water available to the incumbent, and where there is no incremental deterioration in the environment. There would also need to be no drinking water quality deterioration from transferring from a new source to the network.

10) Competing water resources provider to a new retailer

This is a variant of the model above, and is one of the options provided for in the Water Act 2014. The key difference is that the new entrant sells the abstracted water to an independent retailer it is connected to via contracts or ownership, with the incumbent providing treatment and distribution services to the new entrant via third party access charges.

In addition to the barriers identified for the freestanding model, there are barriers resulting from the absence of access prices for treatment and transport, the need to develop market codes and a contracting structure and the requirement for simultaneous entry into the retail and water resource markets. Entering two markets together increases complexity for the entrants.

The public benefits would arise in a similar way to the freestanding model, with the possibility of additional customer benefits being created by the new retailer from lower costs and / or better standards of service.

11) Alternative sludge treatment provider

A new entrant or a rival incumbent carries out sludge treatment for the incumbent and sells the end products of sludge treatment (energy from waste, gas to the grid, fertiliser) to a 3rd party wherever possible. The market is local and centred around one or more wastewater treatment works, and is limited by the economics of transporting sludge long distances.

Barriers to entry include existing environmental restrictions on co-digestion of bio-waste, the capital requirements of a new treatment plant, the uncertainty over Government policies on renewable incentives, the lack of information on sludge treatment volumes, capacities and price differentials. The incumbents already have significant capital invested and so may aim to keep service in-house rather than contract for it externally.

Public benefits can arise if the total costs of the new entrant are less than the marginal cost of the next lowest cost alternative sludge treatment to the incumbent's own works, by increasing the scale of bio-digesters and via reducing transport and treatment costs. Lower costs can be translated into lower prices for sewerage customers.

Note: (m) UK Government response to consultation on reforming the Water Abstraction Management System, 15 January 2016

12) Direct ownership of major assets (e.g. reservoirs, treatment plants)

Ofwat's Water 2020 proposals contain an extension of the independent Infrastructure Provider model used for Thames Tideway Tunnel, to cover a wider range of major new assets. An operator other than the incumbent provides design, build and operation services for a new discrete large scale enhancement infrastructure asset, and possibly independent financing. There are many different variants of this business model and they could include build only, operate only, design-build-operate, design-build-operate-transfer, and others. In principle the model can be applied to any sufficiently large and discrete new asset in water or sewerage.

Barriers to entry include the high capital intensity of the project, the need for well-developed regulatory frameworks and contracts and the need for risk allocation to make projects attractive to infrastructure investors. If the assets need to inter-operate with the existing networks there will be barriers due to uncertainties around ownership and accountability for operational performance issues and licence obligations. Bidders will also face significant procurement and transaction costs arising from a competitive, lengthy and expensive bidding process leading to high bidding costs. A clear pipeline of future bids for similar projects would be necessary to reduce these costs and avoid price increases to customers.

Net public benefit could arise if the total costs of the new entrant are less than the total cost of the next lowest cost alternative project available to the incumbent. This model could also help to get projects realized which would not otherwise be carried out by the incumbent if there were financial constraints.

13) Water trading

A neighbouring incumbent abstracts and sells raw water to the incumbent. The incumbent treats and distributes the water to its customers via its own network. The market is local and limited to where water is available near to a water company boundary, where there is sufficient demand and the costs of the interconnection link make the trade economic. Bulk supply trades are occurring today but Ofwat has introduced incentives to promote it and the Water Act 2014 changes will make water trades easier in future.

Barriers to entry include the low level of interconnectivity between existing networks. New physical connections will require up-front investments. The model has been constrained by incentives that favour capex over opex expenditure, though the totex approach is intended to reduce this effect. There are also barriers due to the lack of long-term considerations for optimising water use, as water trades today are considered mainly as a short-term solution during periods of scarcity. Changes to abstraction licencing are also intended to make certain trades easier and so more likely to occur.

As with other models related to water resources, a net public benefit could arise if the total costs of the trade are less than the marginal cost of the next lowest cost alternative water available to the importing incumbent, and provided incrementally there is no deterioration (and preferably improvement) in water available to the environment.

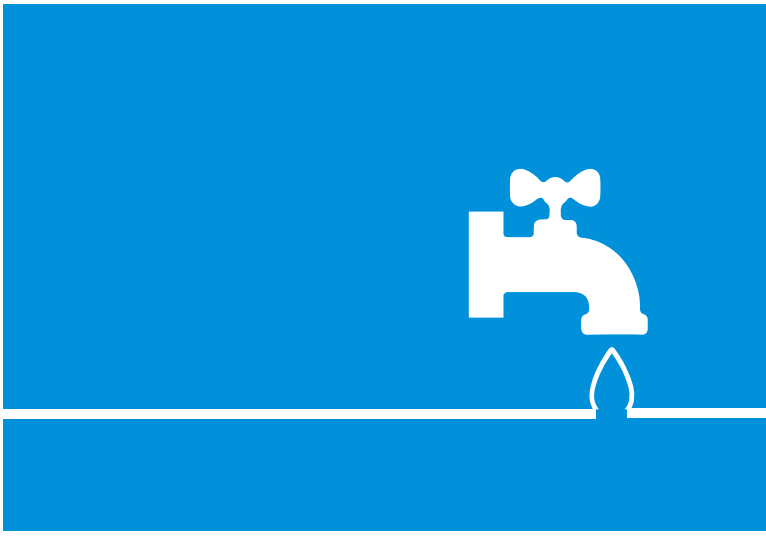
14) Abstraction right trading

Abstraction right trading is an enabler for efficient use and allocation of available water, not an activity likely to be carried out in its own right. As the new activity consist of pure right trading on a permanent basis (either for the whole licence or only part of the licence) it does not involve any physical flows, so this model works best in combination with one or more of the models involving new sources of water.

At the moment several factors hamper the operation of this business model. First there is a nil value of existing abstraction licences, and although there are proposals to change the basis of allocation, licences volumes are not currently allocated on the basis instead of needs / current usage. Second, the cost of licences is administrative only and does not vary with the volume abstracted nor does it take account water scarcity and any environmental impact of abstraction.

If this business model begins to attach a value to water it would lead to higher costs to customers. A public benefit will arise if the emerging value of water creates offsetting benefits where improved allocation of scarce resources and / or the environmental benefits are greater than the additional costs incurred.

The UK Government is currently considering different ways of reforming the abstraction management system. The latest proposals in Defra's statement of January 2016 set out the potential for a series of pre-approved trades, with brokers encouraged to provide fast and efficient trading systems, but with the players limited to those with a direct interest in water use, rather than pure traders.



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Produced by Create Graphics I Document number: CRT071697 | December 2016