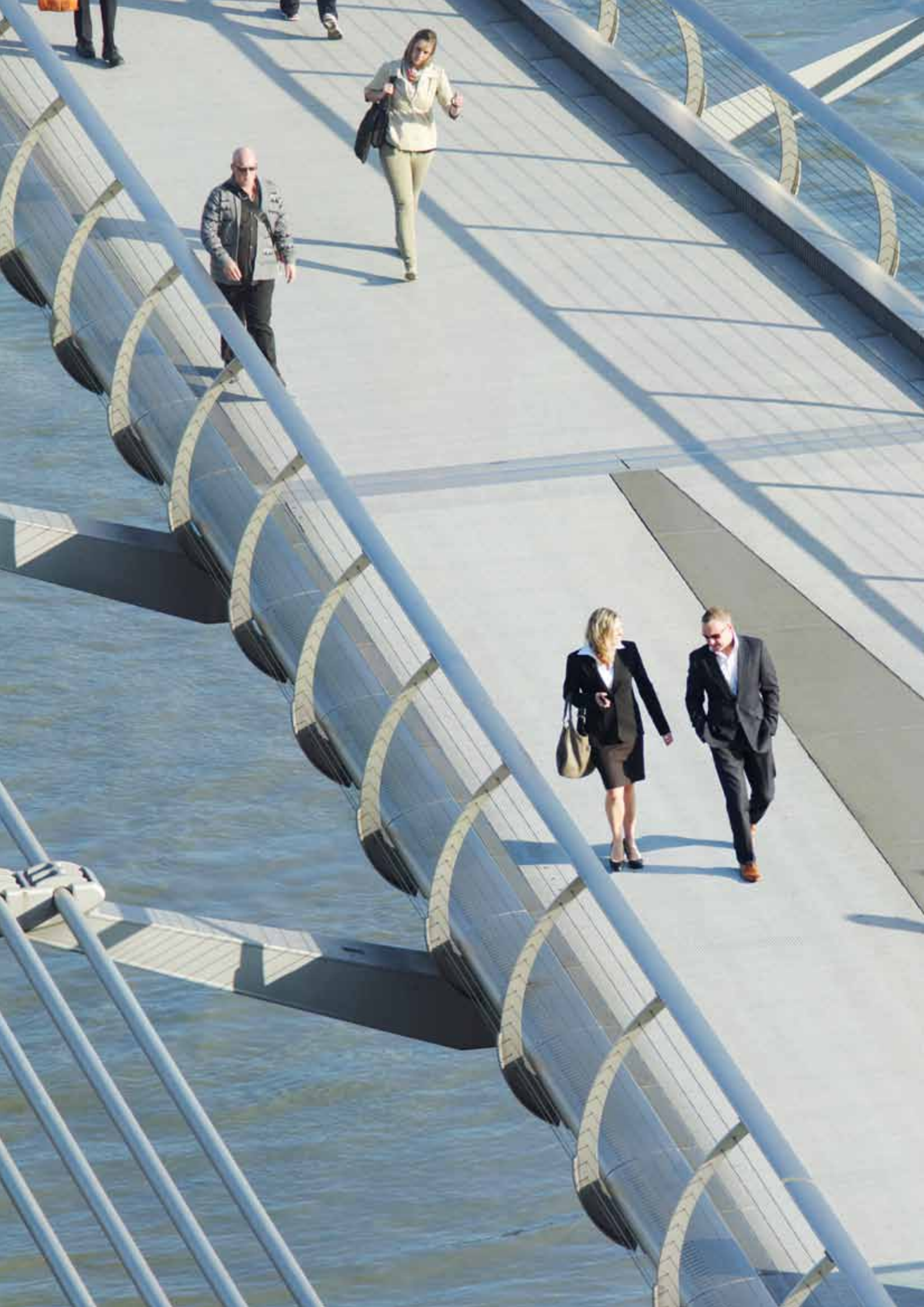
May 2016

The water and wastewater sectors

The long view

pwc

YorkshireWater



Contents

The water and wastewater industry faces new challenges

The industry has successfully delivered improvements to the water environment. Now it faces new challenges it must address.

50 million
households and non-households receive good quality water, sanitation and drainage services as a result of 26 years of investment

Over £108bn
invested since 1989 in improving assets and services with a further £44bn investment planned in 2015-20

Since privatisation in 1989, the water and sewerage sector has delivered substantial improvements in services to customers in England and Wales. These include significant improvements to the water environment and drinking water quality as well as enhanced focus on customer service.

This paper acknowledges the success of the industry to date and the challenges which the sector faces, now and in the future. A range of scenarios are presented which we hope will stimulate discussion on the long term vision for the sector.

All of the scenarios are intended to be plausible. Hence, for example, while there is current debate regarding re-nationalisation, we consider that there are unlikely to be any gains from the substantial costs of nationalising when the sector is delivering successfully for customers and the environment. It is therefore not considered a credible option.

7.3%

expected population growth in England and Wales by 2025

Population of London expected to rise by

18.8%

2°C

average temperature rise in south east England by 2040

4^0C by 2080

(Source: UKCP09)

Climate change impacts the sector will need to deal with include increased risk of ***flooding and drought***

(Source: Defra climate change explained/IPCC)

17%

The number of water bodies achieving good ecological status after the first cycle of the ***Water Framework Directive***

A wide range of stakeholders are currently involved in Ofwat's 'Water 2020' programme. This considers the challenges for the water environment and how the sector might need to evolve and respond. The evidence base for these challenges and the need for change is broadly agreed upon:

- Uneven distribution of population and water resources already present issues of water scarcity and ecological impact. These will be exacerbated by future population growth and climate change.
- Challenges relating to water quality. For example, how improvements can be delivered in an efficient manner without compromising the environment.
- Resilience to maintain service and protect the environment in the face of any disruption (e.g. extreme weather events) will be key in the future. An ageing asset base is also likely to need smarter investment to improve resilience. Financial resilience and maintaining the confidence and trust of current stakeholders is also imperative.
- Affordability and perceived value for money are likely to remain a concern in the future, with differing pictures between regions and for both household and business customers.
- Technological innovation will be key to managing future challenges – both adopting technology used elsewhere and new innovation to meet specific needs.
- Customers' wants and needs are set to rise as digital technology increases customer awareness of water usage and expectations increase in line with other sectors.
- The sector will be under increased pressure to cut its carbon footprint to reduce energy and resource impacts.

The range of future scenarios discussed in this paper consider the challenges such as those above as 'drivers' for change which would influence the evolution of the water sector. Whilst some of the scenarios are a small step from the current situation, others describe significant evolution over the long term.

The various challenges and drivers, and their interactions, raise vital questions about the future of the water sector. What will the sector's scope be in the future? Who are the future investors? What sorts of organisations will be active in providing services, and how many? How will the global landscape affect the UK?

Six future scenarios

The scenarios chart futures shaped by different views of the overall direction for the water environment

In order to develop potential scenarios, we have defined a scope which includes the services delivered within the water environment in relation to provision of clean water, drinking water, sewerage and sanitation, environmentally related services (such as pollution control, flood management and environmental stewardship) and service coordination. Within this scope, there is considerable opportunity for the sector to evolve in terms of:

- Changes in co-ordination of activities
- Re-allocation of activities between different entities operating in the water environment or providing services to those entities
- Changes in the mix of private and public sector participation.

Each scenario sets out a pathway towards a plausible future as a result of different responses to the challenges faced. The scenarios are not necessarily mutually exclusive and do not always refer to the entire value chain.

The following pages set out how the sector might evolve under each of these scenarios, and the dominant driver that underlies each one. Each scenario has a description and an indicative timeline. The timelines show how the industry could evolve away from the current model over the long term. We also consider policy developments, technology breakthroughs and disruptors that could drive the sector further in a given direction. We have taken known market reforms as a 'given' and assume these will proceed in parallel.

1

Market forces in action

The sector is re-shaped as a result of introducing liberalised, regulated markets. The value chain becomes increasingly segmented.

2

Community water

A thriving landscape of 'last mile' water and wastewater companies emerges, as communities engage to deliver local 'sustainability' services.

3

Co-ordination of the environment

The need for co-ordination of the water environment re-shapes the sector. WaSCs co-ordinate water management on a catchment basis and third parties bid to build and maintain flood defences under the coordination of a national system operator.

4

Economies of scale

There is consolidation of the water and sewerage networks and flood management driven by the need for future economies of scale to deliver improvements whilst keeping bills affordable.

5

Customers at the centre

Customers demand service improvements, empowered by the information available to them in a digital age.

6

Smart network technologies

In-home monitoring and control technology, coupled with smarter networks blurs the divide between water and energy.

Market forces in action

Now

Non-household retail market opens. Companies compete to retain and acquire customers. Companies develop value-adding services and differentiate their offerings in the new market.

Ofwat Water 2020 consultation. Proposes unbundling in water resources and sludge markets.

PR19 – separated water resources and sludge controls. Government initiates policy reforms to enable the new markets. Sector develops market arrangements.

Market opening in sludge and water resources. Companies start to compete for sludge treatment, sludge disposal, water resources and water trading.

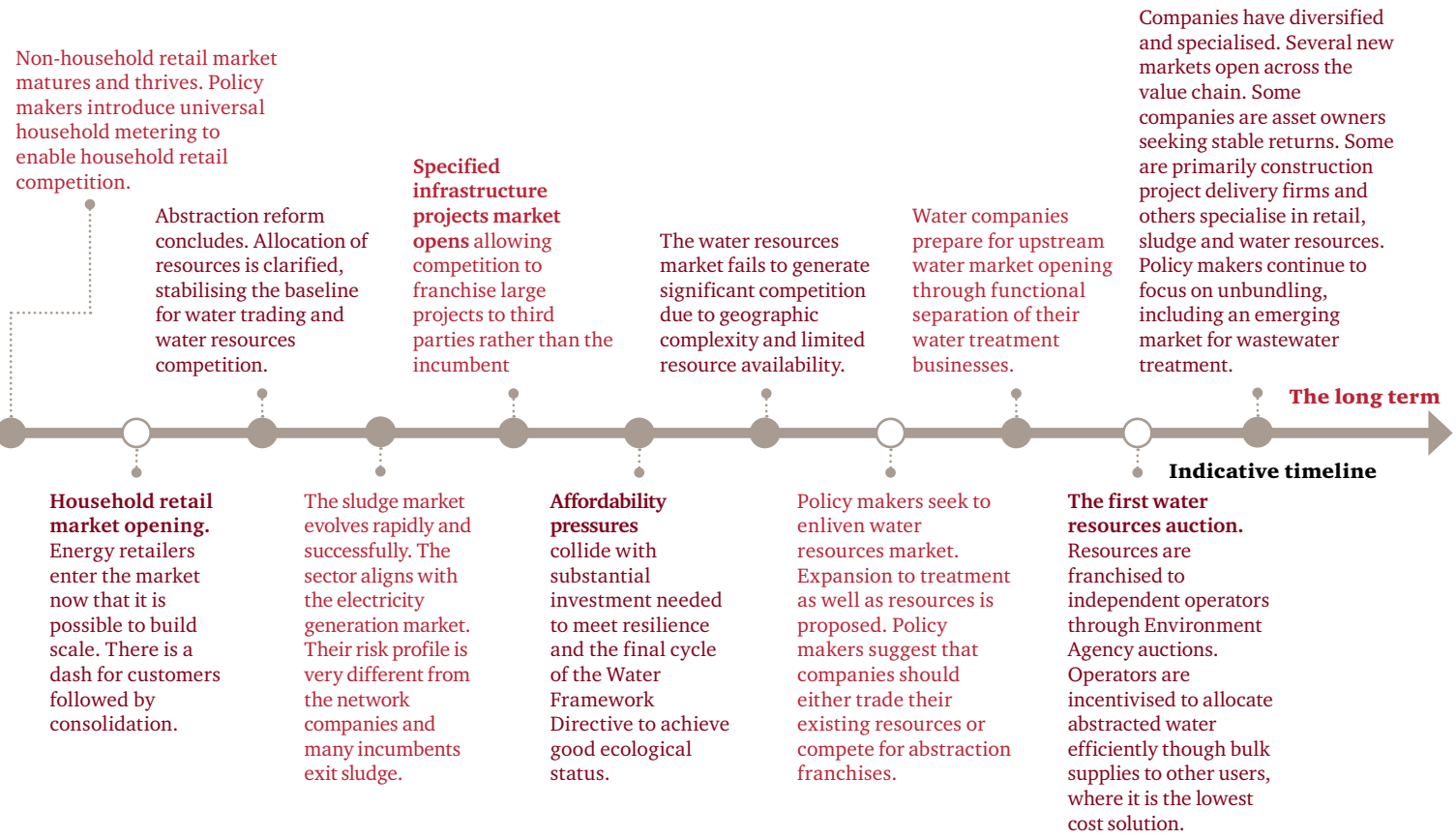
The sector is re-shaped as a result of introducing liberalised, regulated markets. The value chain becomes increasingly segmented.

Where is this happening already?

The Scottish non-household water and wastewater retail market has been open since 2008. When the Anglo-Scottish market opens in 2017, customer numbers will increase tenfold. In anticipation, the Scottish market has attracted a significant number of new entrants. The incumbent retailer (Business Stream) is now seeing market share reductions.

WaSCs are starting to set up subsidiary companies that convert municipal organic waste to energy. After the sludge market opens, they may be able to combine this with sludge digestion to generate scope and scale economies.

The Thames Tideway Tunnel (a 'super-sewer') is the first large project to be delivered under the 'specified infrastructure projects' arrangements. It is financed and constructed under an independent third party operator.



We assume in this scenario that policy makers see market forces as the principal means of driving value. Consequently, water and sewerage companies increasingly separate the network monopoly and contestable parts of their businesses. Networks remain regulated, whereas other services are increasingly subject to competition for and in the market. Key drivers include:

- Use of market forces to drive efficiency, innovation and focus. Belief that this will resolve future challenges.
- The likely need to construct sizeable nationally significant infrastructure. Policy makers believe in using market forces to deliver large projects efficiently.

In our long view, the industry looks very different. There are core regulated network monopolies and licensed contestable or contracts businesses. The industry is a mix of functionally, legally or fully separated entities, each with different risk profiles and skillsets, spanning the following service segments:

- Legacy networks, where assets are regulated in perpetuity. There is consolidation over time, but the segment retains sufficient comparators for Ofwat to use for comparative benchmarking.
- Treatment, where new assets are subject to full competition, and the value of existing assets is protected but their operation is contestable.
- Regulated franchises for larger new build network, treatment, water resources and flood defence projects.
- Last mile services companies providing local network, retail, non-potable water and drainage to communities or businesses.
- Water resources companies, competing for access to water rights, and selling water to retailers. These providers also find innovative ways to provide local potable and non-potable water to communities.
- Energy generation companies that have grown from the sludge treatment and disposal segments.
- Retailers, operating in multiple industries (water and wastewater, household and non-household). Retailers will have multiple strategies – some will specialise in serving the domestic and SME market; others will provide more technical tailored services to industrial and commercial customers.

Community water

Now

Policy makers encourage local water collection and sustainable drainage in urban areas. An environmental credit system, linked to BREEAM/Ecohomes standards, incentivises local water optimisation.

We assume that several years of winter flooding with dry summers and hosepipe bans highlight the need to capture rainwater better across catchments.

The first community water companies emerge, partnering with developers to deliver non-potable water to new builds. Activities include rainwater harvesting, greywater recycling, porous paving and sustainable drainage.

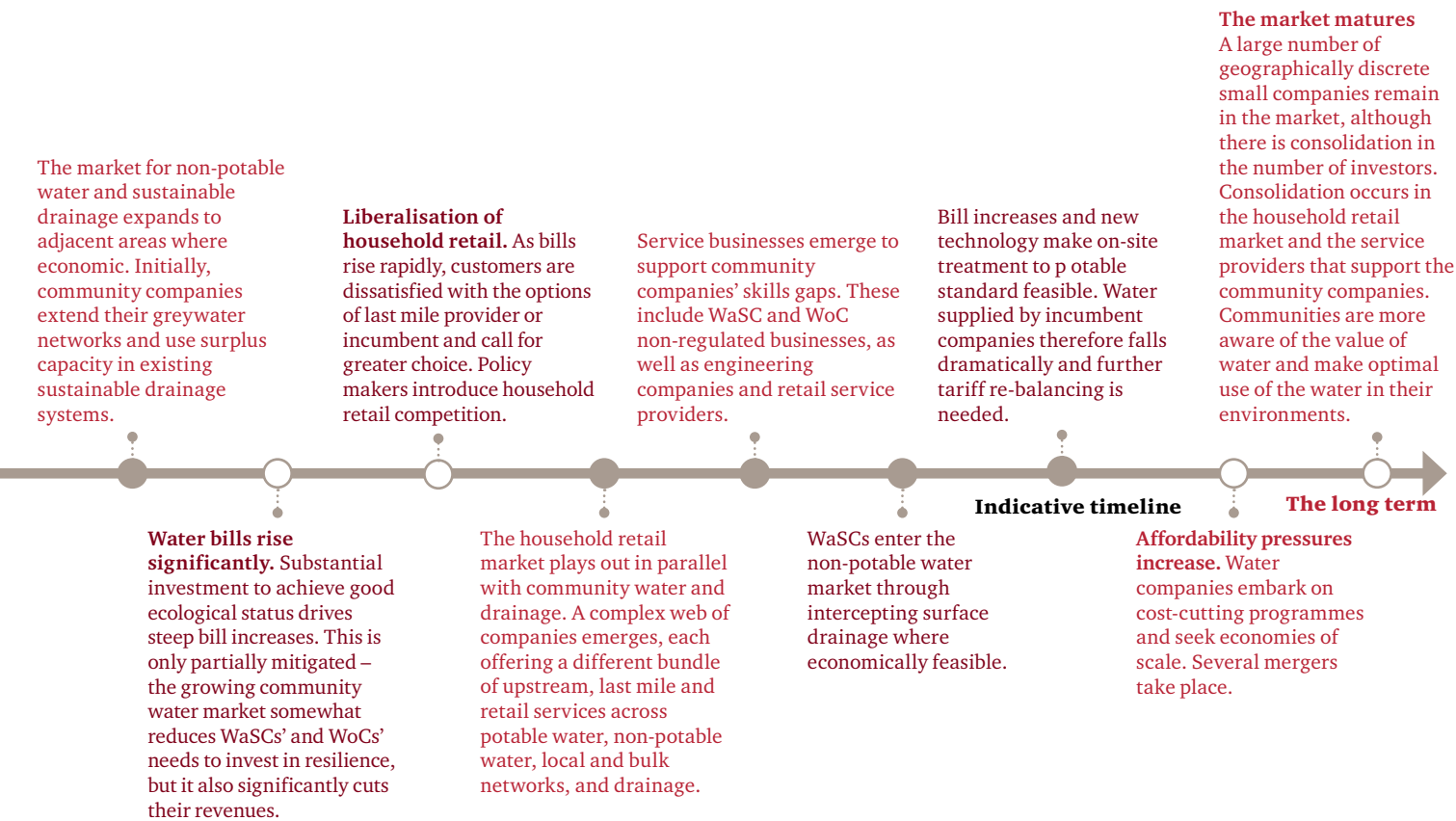
Community companies take advantage of urban rising groundwater to abstract and provide non-potable water supplies. Once aquifers below cities reach sustainable levels they recharge them artificially using winter runoff.

A thriving landscape of 'last mile' water and wastewater companies emerges, as communities engage to deliver local 'sustainability' services.

Where is this happening already?

The first community water initiatives include housing developments with rainwater harvesting, green roofs and water conservation initiatives (e.g. dual-flush toilets, aerated taps, and easy to view water meters) as well as carbon-neutral status (e.g. through self-generation). In future these might be scaled up and run as local businesses providing a service to a wider community.

Existing 'last mile' water companies ('inset appointees') are well placed to enter this market, as are multi-utility service companies and community energy companies. NAVs are looking to expand their service offering to developers, for example to maintain on-site sustainable drainage systems.



In this scenario, we assume that policy makers encourage local use and management of rainwater and this is also championed from a citizens' perspective. Many small community-based companies emerge. The drivers include:

- Climate change. Better use of rainwater is needed to secure supply as floods and droughts become the new normal
- Policy makers believe that local provision of water and wastewater will resolve the issues. They provide a framework to incentivise local 'last mile' companies and citizens to change their behaviour
- Push from society to do things differently in adapting to climate change. Sustainable living becomes desirable and key to this is local management of water.

In our long view, a diverse, thriving local market emerges supported by WaSCs and WoCs. Incumbents' market share gradually falls as local solutions arise. Many small companies provide services to individual communities. Communities value water. Quality of life is enhanced within communities that work together on sustainable and integrated water management.

A thriving service industry grows to support and partner with the community water companies. These are larger specialist companies operating in areas where community companies lack skills. For example, retail, engineering services, or metering. Partnering with other organisations allows the community companies to provide end-to-end services to their customers.

Where customers want to pay for resilient supply or quality, WaSCs and WoCs provide stand by or back up services. The incumbent WaSCs/WoCs also retain customers for whom the community water model is either too costly or perceived to be too risky. WaSCs enter the non-potable water market through adapting their drainage networks to recycle urban run-off.

Community water companies will need a range of skills. For example, customer-focused operational staff available locally to provide water, wastewater and other services. The service providers to community companies need to achieve both scale economies in their specialist area and provide a tailored local service.

Co-ordination of the Environment

We assume policy makers see the successes of catchment management schemes in 2015-20 and increase the sector's co-ordination role.

Upstream competition introduced, including water resources, sludge treatment and sludge disposal.

Now

Water companies are increasingly involved in **catchment management**. The scenario assumes this reverses the trends in diffuse pollution.

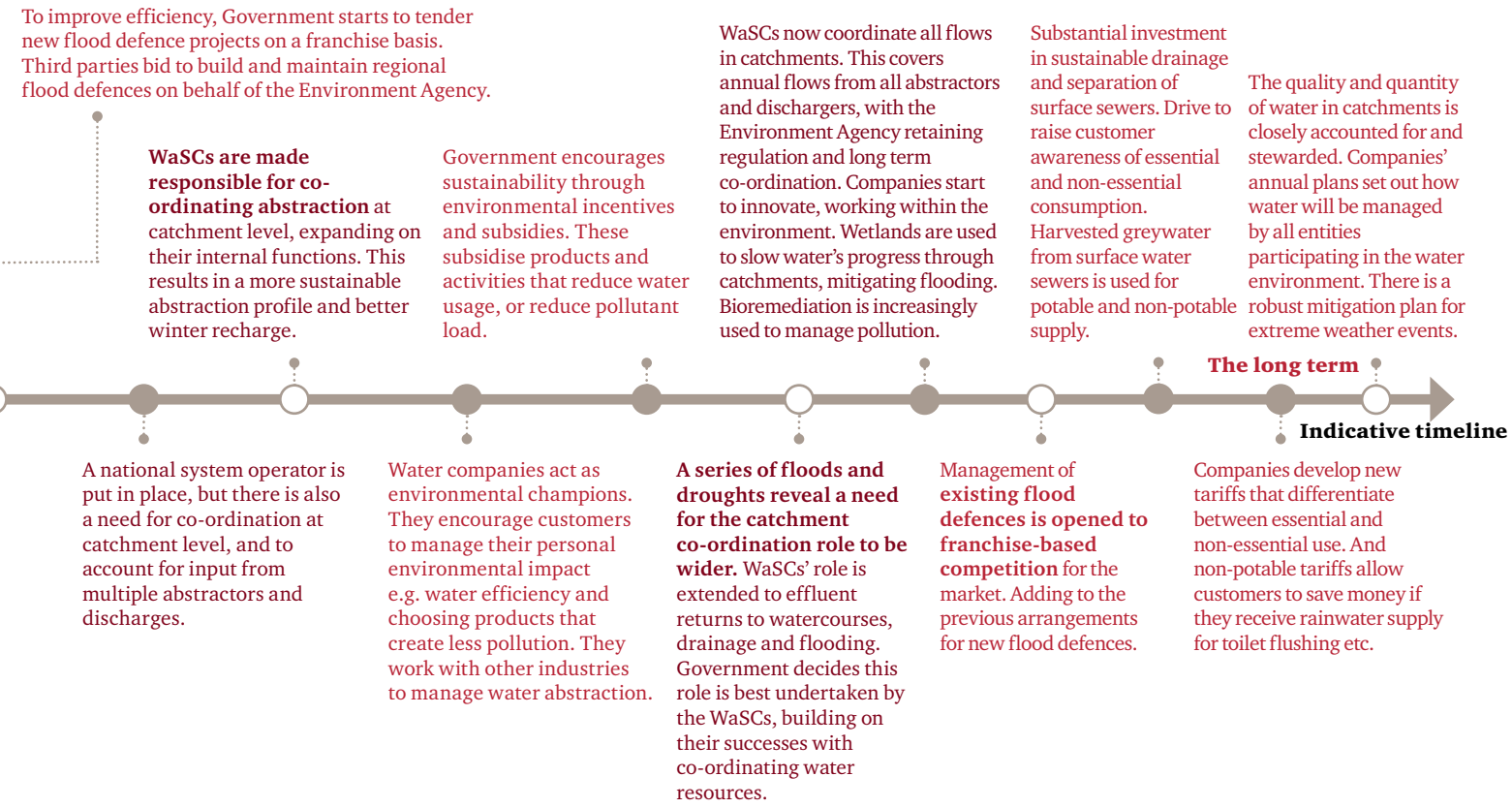
Alternative suppliers enter the new markets. The landscape becomes complex when entrants are added to the existing mix of WaSCs, WoCs, in dustrial abstractors and industrial discharges.

The need for co-ordination of the water environment re-shapes the sector. WaSCs co-ordinate water management on a catchment basis and third parties bid to build and maintain flood defences under the coordination of a national system operator.

Where is this happening already?

The Water Framework Directive embeds cross-sector collaboration to improve the water environment. WaSCs and WoCs are currently using catchment management to manage diffuse pollution. This involves interaction between the water sector and agriculture. In future, WaSCs could also work with manufacturers (e.g. of detergents) to reduce pollutants at source.

Catchment Abstraction Management Strategies, and co-ordinated drainage committees have brought key bodies operating in the water environment together to plan activities at catchment level.



We assume in this scenario that the sector cannot meet future challenges without a step change in co-ordination. We draw on recent thinking by Dieter Helm on catchment system operators and co-ordination of flood risk management[1]. Water companies become increasingly responsible for co-ordinating flows in catchments. The Environment Agency retains environmental regulation. The main drivers are:

- Climate change. A need to think holistically about the use of water in catchments, to optimise the use of all water within the catchment e.g. balancing abstraction through the year, supporting biodiversity
- Polluter pays. Making the polluter responsible for their impact on the water environment creates a need to work differently

In our long view, WaSCs optimise water management within catchments, and co-ordinate efforts to minimise pollutant load at source.

Functionally separate catchment co-ordination divisions publish annual water plans that manage all abstraction, discharges and flow support to catchments.

Flood frequency and severity is significantly reduced. From the headwaters to treated effluent discharge, interventions are designed to slow the progress of water from source to sea.

Better protection of recharge across all water bodies in a catchment makes supply more resilient during the drier summers that become the climatic new normal.

Companies consider their networks as an extension of the water environment, including natural and engineered assets. Reservoirs and groundwater support watercourses and water distribution. Sustainable drainage is increasingly used both to support the environment and to augment supplies to customers. Local greywater recycling and rainwater harvesting is part of the solution to slow water's progress through catchments.

Companies will need to become significantly better at working co-operatively with third parties to optimise the quality and quantity of water in a catchment. Co-ordination between the water and sewerage functions of WaSCs and WoCs will also become critical as the industry needs to smooth gluts and shortages of water.

Developing softer negotiating skills, and using the environment alongside traditional civil engineering will be challenging. Companies will need to be more joined up internally, and use unconventional solutions.

Although WaSCs may be well placed to take on this role, ring fencing may be needed between catchment co-ordination functions and other segments of the value chain when upstream markets open to competition.

[1] Dieter Helm, May 2015. 'Catchment management, abstraction and flooding: the case for a catchment system operator and coordinated competition' and January 2016. 'Flood defence: time for a radical rethink'

Economies of scale

The scenario assumes that prolonged and deepening global recession occurs

Other countries address Government debt through UK-style privatisations, creating new comparators and opportunities to invest abroad. Some UK water companies invest abroad.

Now

There is increased pressure on customer bills and an increased population of 'water poor' customers. Disparity between average household income and average bill varies regionally. Areas of highest water poverty also have the highest bills

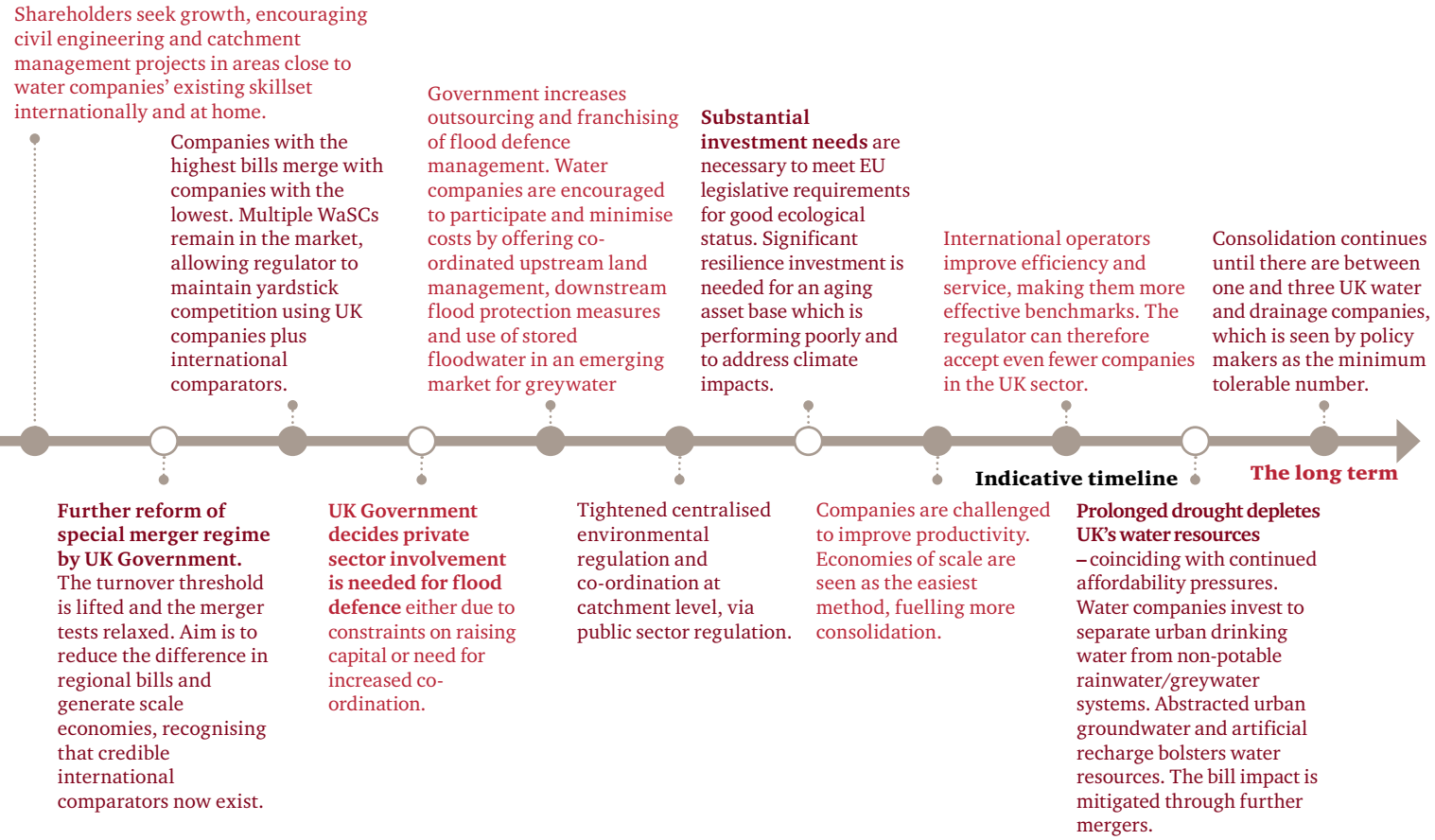
Investment surge. Investors see stable, low-risk opportunities in the sector, bringing an inflow of private investment. Water and wastewater are seen as a good investment in a tough market.

The consolidation of the water and sewerage networks and flood management driven by the need for future economies of scale to deliver improvements whilst keeping bills affordable.

Where is this happening already?

Pennon has recently acquired Bournemouth Water. The merger was referred to CMA under the special merger regime, and Ofwat did not oppose it. The CMA investigation is now complete and Pennon is starting to merge South West Water and Bournemouth Water.

Legislation to relax the special merger regime has recently come into effect. This removes the current mandatory merger referral, replacing it with a two stage test. Companies may now provide 'undertakings in lieu' of reference to demonstrate how they will mitigate the loss of a comparator. The reforms are expected to result in a targeted increase in consolidation, where it is beneficial to customers.



In this scenario, we assume that the conflicting drivers of future water affordability and substantial investment needs collide. Economies of scale and increased private sector participation are seen as a way to maintain acceptable bill levels. Protecting vulnerable and low income households is a key policy concern.

This scenario considers the natural monopoly parts of the value chain. (The non-household retail market is assumed to evolve separately in parallel and household competition if it is found to be beneficial.) The drivers are:

- Policy concerns about water poverty and pressure on bills
- Regional disparities in bills that increase over time
- Investment needed to improve environmental outcomes, flood management and resilience are assumed to be substantial. The industry innovates to improve efficiency, but further economies are needed to maintain acceptable bill levels
- Substantial resilience investment is needed in flood management, or a strategy to reduce overall investment through greater co-ordination leads Government to increase private sector participation in flood defence.

In our long view, this results in 2-3 large network water, sewerage and flood defence services companies in the UK. This consolidation could also mean consolidation of networks into 2-3 regional 'grids' with interconnections across regional borders. These companies do not operate over contiguous geographic areas as mergers were allowed on the basis of investor preference and harmonising customer bills.

The companies compete for regional flood defence franchises across multiple river catchments. Successful bidders minimise costs through co-ordination of upstream catchment management, downstream flood protection and greywater storage/resale.

Co-ordination becomes more important as water, sewerage, flood defence and highway drainage functions may not be controlled by the same entity in a given area. Third party catchment system operators are needed to facilitate this as companies may be competing against one another for franchises. As well as a step change in co-ordination, the industry becomes significantly better at doing more with less to generate efficiencies, enabled by technology.

Customers at the centre

Customers demand a household retail market, having seen the non-household market work well. Policy makers commit to universal metering to support the market, but do not find a case for smart meters. Some water companies put smart meters in anyway, others wait.

Digitally-driven service improvements in energy extend into water. E.g., reducing energy and water costs for hot water. This leads to service improvements for all devices using water.

Now

Non-domestic retail market opening from 1 April 2017 creates a thriving market. The economic case for household retail is put forward.

Leading water companies offer multi-channel access for customers (e.g. mobile access) in anticipation of forthcoming competition. Where this is not available, customers push for it.

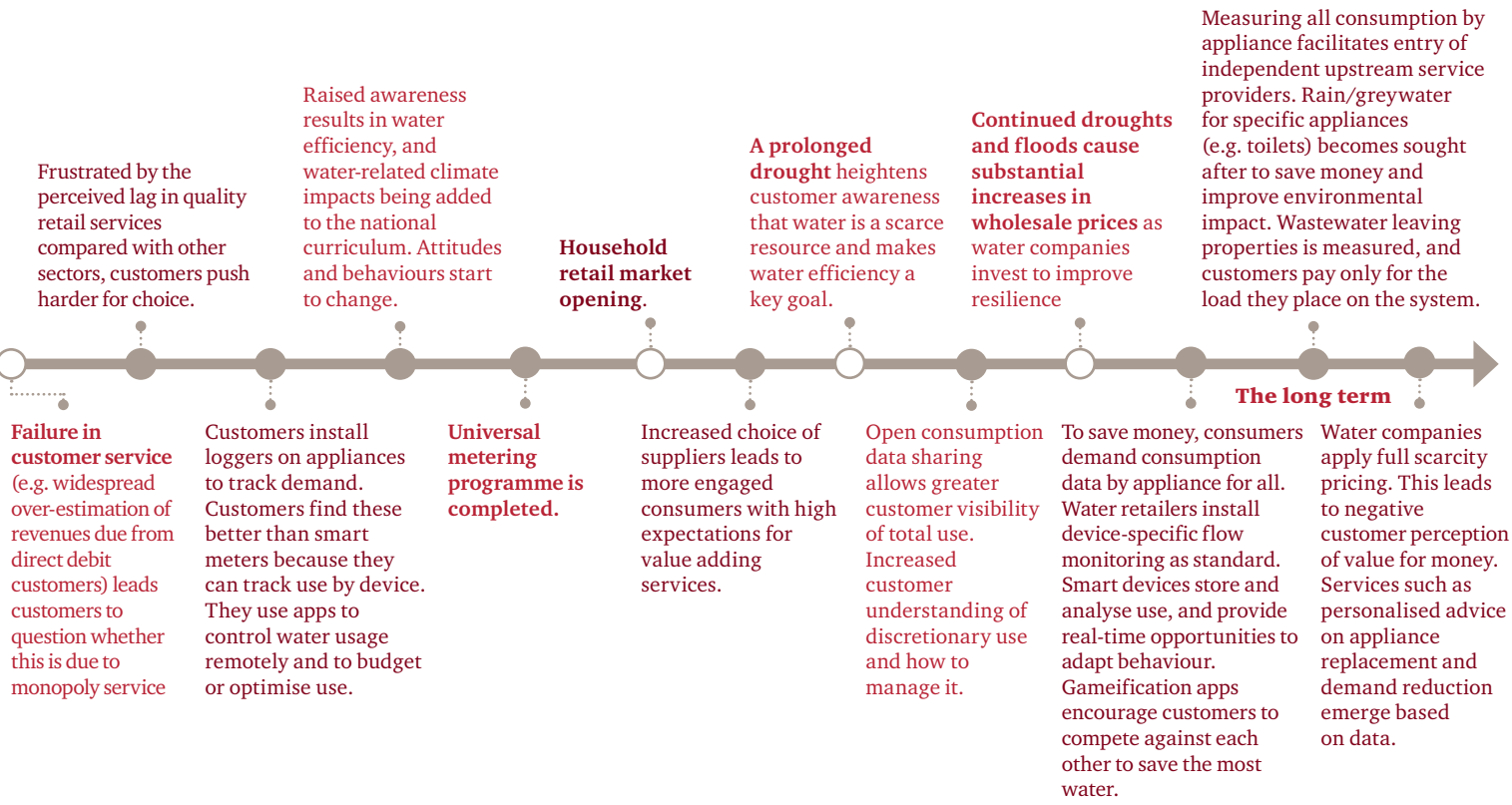
Customers demand service improvements, empowered by the information available to them in a digital age.

Where is this happening already?

Water companies are using data from social media to understand customer opinions and usage. Some also use multichannel access and smart metering. As information improves, companies will start to offer more tailored services and tariffs.

Companies are using apps to help customers manage and reduce their water usage. For example, challenging customers to reduce consumption against their historic demand.

Research projects have used device-specific consumption loggers both to understand how customers use water and to help them manage it.



We assume in this scenario that customers are at the centre, driving the agenda. Policy makers and markets respond when customers demand greater choice. Several factors drive demand for change. Customers:

- Install flow monitoring devices and manage their usage using mobile apps. As their understanding of water and wastewater grows they become more engaged
- Experience retail competition in their workplaces and question why more choice and better service are not available at home
- Experience the 'smart home' for energy, and managing their water services increasingly becomes integrated with the full suite of utility management.

In our long view, a vibrant multi-utility domestic household retail market is in place. The initial 'dash' for customers and explosion of entrants has died down, and the market has stabilised with a smaller number of retailers. Retailers provide energy as well as water and wastewater retail services.

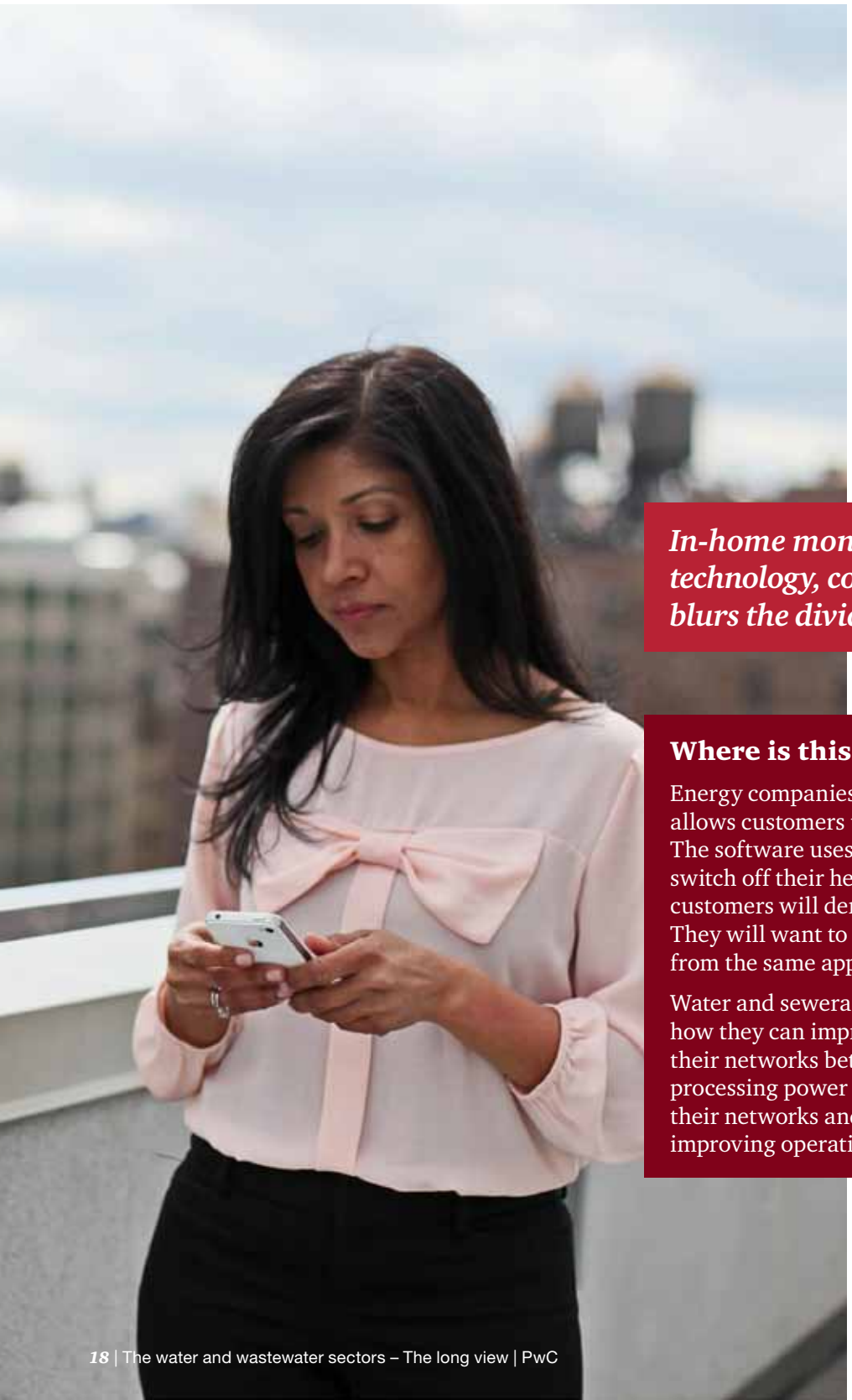
Customers demand product differentiation elsewhere in the value chain. Retailers and 'last mile' companies compete to provide this. Measurement of water usage on a device by device basis is possible. It now becomes technically easier to introduce and measure recycled or harvested water for specific water using devices. This results in market entry where it is economic to introduce competition, for example urban community water and wastewater.

In other parts of the value chain, service improvements driven by customer demands are delivered by regulated businesses. Innovations such as smarter networks are provided through the network monopoly.

In a customer-led world, companies need to have a much deeper understanding of their customer base than they do now. They need to understand which product and service offerings appeal to different customer groups and provide tailored tariff and service packages.

Companies will need to be dynamic and flexible, adopting new technology to provide a customer experience that competes with more technologically savvy retailers entering the market from other sectors. It may not be possible for the industry to attract and employ the skills it needs directly – some companies may enter into strategic partnerships, others may choose to exit, focusing instead on other core skills.

Smart network technologies



Customers' ability to control their energy supply increases. This is driven by the rise of digital natives, the connected home and growing awareness of the link between water and energy use on overall utility bills.

Customers see synergies with 'big data' in energy. Big data companies tell them they could save even more with smart water loggers, leading to widespread uptake.

Now

Policy makers are unconvinced by the case for water smart meters, affordability being a bigger concern. Some water companies put smart meters in for first time installations and replacements.

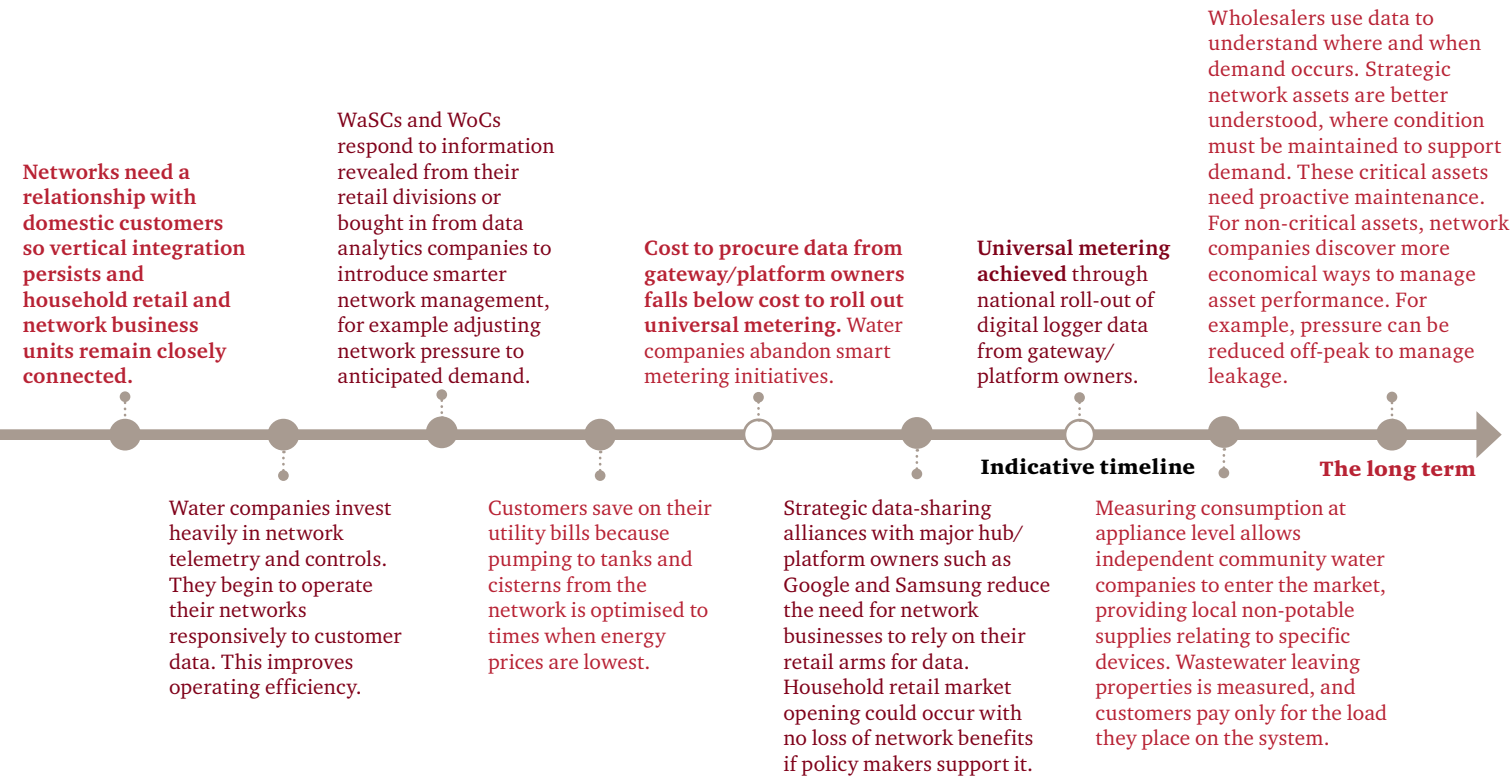
Digital service firms displace customer service functions as smart home services grow. WaSCs and WoCs use granular information about water usage to sell products and services across multiple (non-water) markets that address customers' lifestyles and needs.

In-home monitoring and control technology, coupled with smarter networks blurs the divide between water and energy

Where is this happening already?

Energy companies are starting to use technology that allows customers to control heating from a smart phone. The software uses location to remind customers to switch off their heating when they go out. In future customers will demand similar innovations for water. They will want to control all household utility services from the same app.

Water and sewerage companies are starting to explore how they can improve network data analytics to run their networks better. Companies see improving data processing power and generating better insight into their networks and network constraints as key to improving operational efficiency and effectiveness.



In this scenario, we assume that digital technology blurs the distinction between water and energy. Smart homes technology allows customers to optimise bills, and smart network technology allows operators to run responsively. The drivers are:

- Technology revolutionises the way people manage utility services. They signal to the wholesaler's network as well as control devices in their homes remotely using apps. For example, customers' smartphones automatically signal the network to gear up for their arrival as they commute home
- Managing water and energy together gives the maximum benefit because they are inter-related
- Data enables customers to select specific services that match their lifestyle
- Water companies generate network efficiencies by staying close to customers. They use smart network technology to optimise operation to customer usage patterns.

In our long view, last mile services become so closely linked that the distinction between water and energy retail is blurred. Customers have granular information and start to express preferences to match their lifestyles and finances.

Better weather forecasting and real time customer usage data support smart network technology in water and sewerage. For example, sewerage companies combine better data analytics with improved network controls to hold back storm water. This substantially reduces pollution events.

Household retail remains part of the regulated monopoly. Policy makers recognise the environmental and efficiency benefits of a close connection between customers and the network.

Incumbents' retail functions do not change significantly because the skills reside with other companies. Utilities retail looks to big data companies for customer analytics. Big data companies are also better placed to provide value add retail services. For example, using data analytics to reduce consumption.

Non-household retail evolves in parallel and wholesalers increasingly need to work closely with retailers so that 'smart network' technologies can be made to work for the non-household market, especially for customers with bespoke water and wastewater needs.

What does this mean for the sector?

The long view for the industry is likely to represent significant changes from today's water and wastewater sector.

Each scenario charts how things might look if a single direction dominated the future of the sector. In reality there are many drivers and policy levers that will interact together with environmental and technology changes to shape the sector. The way companies respond to these changes will also shape the future success and direction.

Ofwat's Water 2020 paper consults on an overview framework that will enable Government to apply market forces to the upstream water and sewerage sectors. In our long view the unbundling of water resources, sludge and franchising of large infrastructure projects is just the start of a journey where market forces are increasingly applied to parts of the value chain.

Ofwat is currently assessing the potential benefits of household retail competition – another area of the value chain where market forces could potentially play a part in the long term.

Significant additional co-ordination is likely to be needed whether from separate entities or from divisions of water companies. Co-ordination is likely to be necessary to support market forces, which will make the landscape of companies more complex. It is also likely to be needed to make best use of water as periodic gluts and droughts become the norm.

Technology will inevitably make a big difference to the way services are delivered in the sector. The potential for extending the life of water wholesale assets using a combination of digital technology, microbiology and nanotechnology is intriguing in a world where doing more with less will be important given the need to build resilience and achieve good ecological status.

Technology driven change may happen quite rapidly, especially the impact of the digital revolution of service to customers, where the sector is arguably catching up with recent advances.

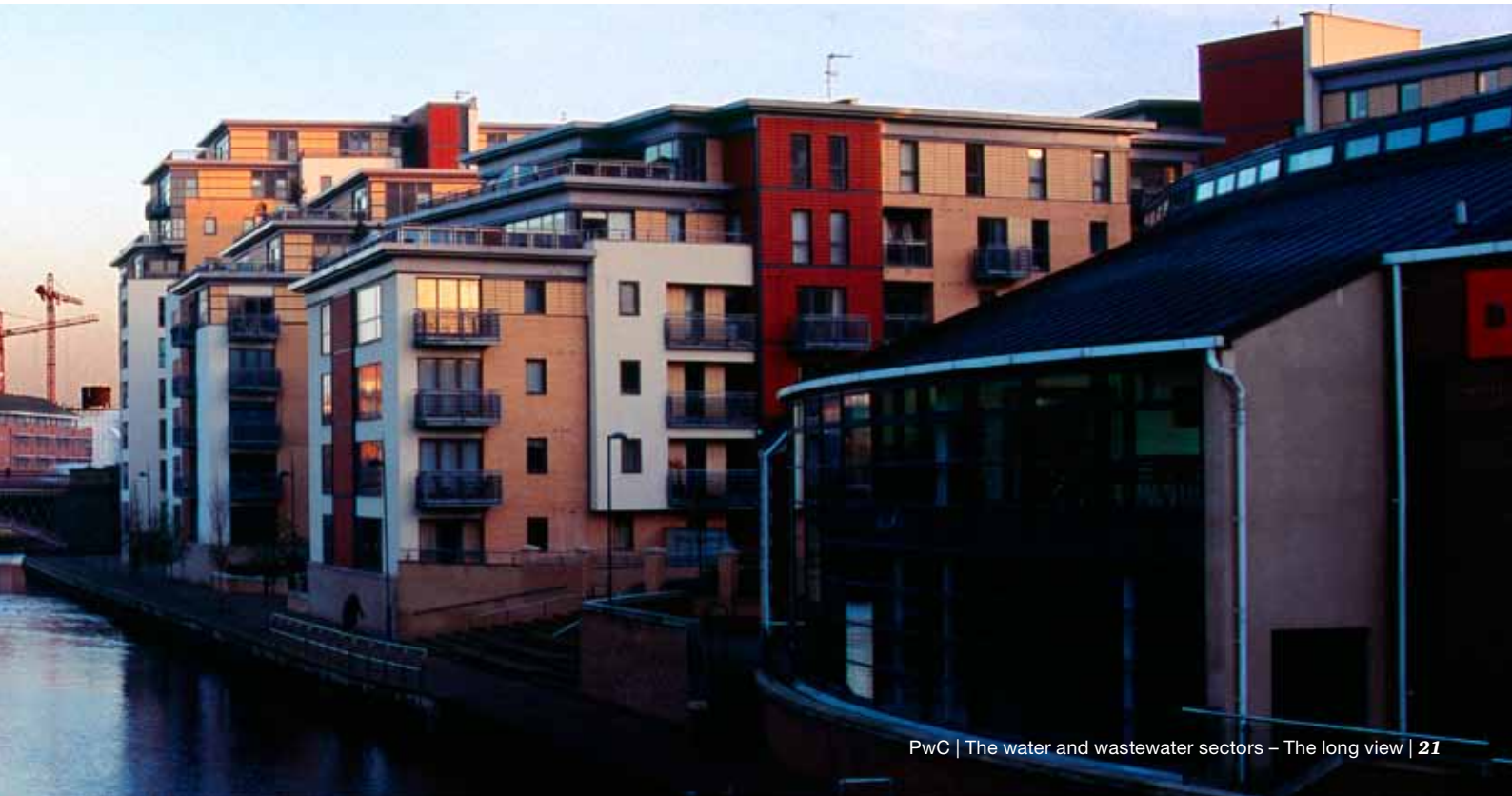
Customer expectations are likely to drive digital innovation in the sector and may result in household power and utilities services blurring into one. Data about and remote control over household devices and fittings is likely to become increasingly sophisticated. The sector may be able to use the new information generated to manage their networks at lower cost, extending the useful life of their assets.

Nonetheless, the upward pressure on customers' bills is likely to continue, with the bulk of the work to achieve good ecological status likely to fall within the third cycle of the Water Framework Directive (2021-2028). Companies will also need to improve resilience to climate change which is likely to involve strategic investment. Careful thought into how companies invest in their assets may not represent the full solution, and other ways to generate efficiency may need to be considered.

The market community companies will operate in potentially blurs the lines between multi-utility offerings and municipal services. As well as water and drainage, community companies might offer other local network services (energy and fibre), local renewable energy generation, assistance with waste management/ recycling, and maintenance of public spaces.

To respond effectively, companies will need to change their corporate cultures. Challenges for the sector will include:

- Competing effectively in new markets
- Addressing resilience and environmental quality at a price customers can afford
- How community water could ease pressure on networks and resources
- Collaborating effectively with other organisations
- Embracing digital customer service
- Becoming more innovative and generating low carbon solutions to key challenges
- Accepting change can't be done alone. Desired outcomes will need to be negotiated through joint working with external parties to generate sustainable improvements to the water environment



Appendix: History of the sector

The fundamental drivers for change in 1989 still stand.

Now there are additional drivers including water scarcity, climate change, resilience, affordability, customer expectations. These are unlikely to be addressed by the same regulatory model and mindset.

The current UK structure is not a globally accepted model. There are many other models which work well elsewhere.

How did the current industry structure arise?

The water industry has developed and evolved over centuries. Arguably, it has generated as much benefit as the NHS in improving public health and combating disease. Clean water and good sanitation is a key underpinning factor for a thriving modern economy. There are two key dates that define today's industry:

- Consolidation into water authorities based on the 10 major river basins in England and Wales in 1973
- Privatisation in 1989

The current structure and functions – the foundations for the sector's future evolution are themselves the product of these key events.

1973 – Consolidation at catchment level

The 1973 Act resulted in ten vertically integrated authorities, whose scope included:

- Water conservation and development
- Water supply
- Wastewater collection, treatment and disposal
- Prevention of pollution and environmental improvement
- Recreational use
- Care of inland fisheries
- Land drainage and flood protection

The 1973 Act also made provision for a Central Water Policy Planning Unit (part of Central Government) responsible for:

- Coordinated water resources planning, water quality and prevention of water pollution
- Research and development
- Advice to Government, the National Water Council and Water Authorities

The ten authorities remained in public ownership and were publically financed (access to capital markets was limited). Alongside the authorities, a significant number of companies (some of which were later to become regulated water only companies or WoCs) provided private supply to specific towns or areas. The main drivers for change in 1973 were:

- Co-ordinated demand management for a growing population and economy
- Control of pollution – rivers and the environment were in decline
- Political and ideological trends of the time, being consolidation focus, technocratic agenda and commitment to public ownership

1989 – Privatisation

The Water Act 1989 privatised the ten authorities. Some of the privately owned WoCs also opted into the new regulated water sector. Key features of the new arrangements included:

- Water and sewerage companies (WaSCs) publicly listed, with investment funding from capital markets
- Independent sector regulation provided by Ofwat (economic regulation, level of service); National Rivers Authority (NRA), now Environment Agency (environmental standards); and DWI (drinking water standards)
- River management functions separated into the NRA, including pollution control, land drainage and flood protection

The scope of the WaSCs under the new arrangements included (and still includes):

- Water treatment
- Water supply
- Water distribution
- Wastewater collection
- Wastewater treatment and disposal

The drivers for change in 1989 were:

- Improvements to environmental standards, driven by EU legislation and the need to reverse declining trends, required extra investment. The UK was under threat of prosecution for non-compliance with EU water legislation
- The need to address inefficiency, which policy makers judged was best achieved through harnessing private sector culture
- Government funded investment from the public sector borrowing requirement was no longer seen as a viable option
- Ideological trends resulted in major privatisation across multiple sectors. The profit motive was considered more effective than state planning, while markets and companies favoured private sector involvement

- Regulation reflected the natural monopoly conditions of a water industry that was no longer controlled by public accountability. Therefore privatisation was accompanied by separation of duties (environmental and quality) and control of pricing and service

Today's water industry has a similar regional structure to that set in 1989, with consolidation of water only companies

More than 25 years on, the industry has succeeded in meeting the drivers that led to privatisation, delivering substantial improvements in efficiency, service to customers and environmental improvements.

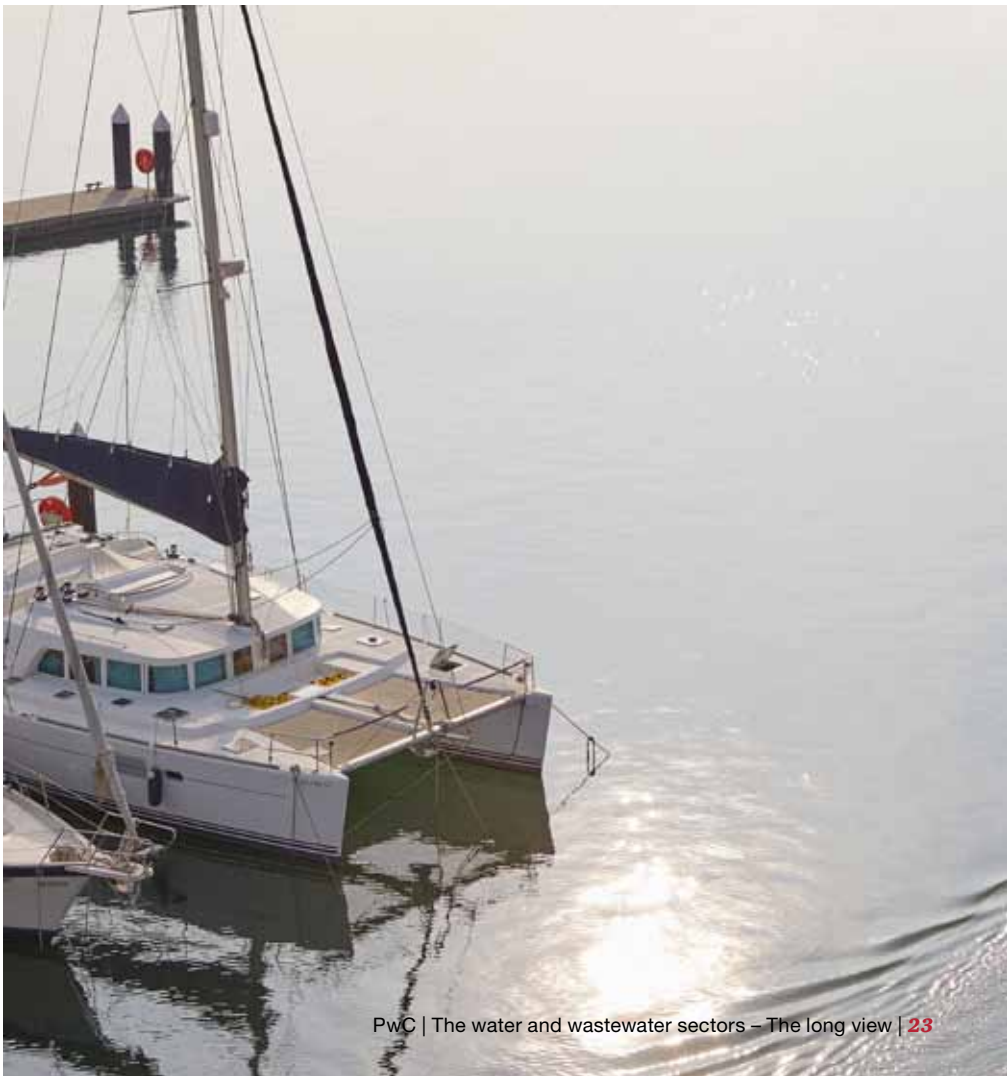
Today's water sector is based on regional monopolies with sewerage provision on a regional, catchment basis and water on a mix of catchment based and a smaller number of WoCs than at privatisation due to mergers (29 at privatisation, 8 now). The companies in England and Wales are privately financed, with equity ownership including listed companies, infrastructure and pension funds, other utilities, and one not-for-dividend company limited by guarantee. The role of debt finance has increased over the years since privatisation. In Scotland and Northern Ireland, water and wastewater remain Government-owned with an economic regulator in place.

Drainage functions are shared between the sewerage companies and others (Environment Agency, Drainage Boards, Local Authorities, Highways Agency).

The structure and functions of the sector continued largely unchanged until 2014, when the Water Act brought liberalisation for the non-household retail sector with the possibility of companies exiting non-domestic retail.

The international experience shows that the UK structure is not a given

Unlike other regulated sectors, such as energy and telecoms, the UK privatised and regulated regime has not been widely adopted globally. Public asset ownership is more prevalent globally than private shareholders. Some of the privatisations that did occur were later reversed. Private sector involvement is often through contracts to build or operate infrastructure, or concessions/franchising. The England and Wales model is not globally accepted and we have therefore not constrained our analysis to this model.



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