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What does the future hold for the water industry in the UK? With continued pressure created by sustained population **growth and climate change**; demands from both government and the public to improve the **quality of our river catchments**; fresh calls to improve the **resilience** of our ageing water systems; and the need to maintain prices at **affordable levels**, the water industry must become **more innovative and more efficient** if it is to successfully balance its response to these competing pressures.



Turning the tide: Six imperatives for a smarter future



35%
growth in water demand could be possible by 2050 due to population growth³

Defra's recent white paper, *Water for Life*, highlights the dependency and strategic importance of our water systems, reinforcing the need for a more efficient, more resilient and more customer focused future.

The regulators too are challenging traditional approaches. The Environment Agency's *Case for Change* has published evidence in support of Defra's conclusions, focusing on current and future water availability, and calling for reform of our historic water abstraction and management¹ regimes. Ofwat, meanwhile, has published a consultation paper on the introduction of future price limits² – one for wholesale services and the other for retail services.

DISTILLING THE WATER CHALLENGE

Across the industry, the pressures are growing and the core challenges are becoming clear:

Our water resources are under increasing strain due to population growth and climate change. These are combining to increase both demand and required levels of abstraction, and thereby harming the natural balance of our river catchments and ecosystems.

Our water assets are ageing. Our society and economy are critically dependent on secure and resilient supplies. If we are to improve the resilience of our water supply, then significant ongoing investment is needed to replace and maintain our existing infrastructure, and to develop new water resources.

Our water must remain affordable. This means striking a balance between the need to invest and the cost to consumers. Production processes need to become more efficient and investment programmes more focused.

TURNING THE TIDE

Fresh focus on the water industry has prompted much public debate about how best to respond to this renewed sense of urgency. The industry faces a clear choice: either it can continue to address these challenges at the current pace using traditional approaches, or it can seek to turn the tide by changing the rules of the game and accelerating the pace of change. We recognise that no single initiative will solve the challenge we face today, yet by focusing on the full life-cycle of our water processes, from catchment to coast, there is a clear opportunity to drive improvement in the following areas:

Better catchment management: encouraged through increased adoption of catchment-based management approaches, which bring local stakeholders together to improve collaboration and develop shared and more integrated catchment management plans.

More sustainable abstraction: established through the evolution of abstraction regimes which achieve a better balance between human demand and the ongoing need to protect our environment.

Improved production and network efficiency:

generated through an improved understanding of production and delivery costs across the entirety of the water network. Here, the future introduction of price limits provides further incentive to scrutinise and optimise water production, distribution and collection arrangements to ensure the efficient and sustainable use of water resources.

Improved whole-life infrastructure management:

supported by looking beyond traditional solutions and exploring new, more innovative ways to optimise the blend of capital and operational expenditure.

Better, more collaborative water resources planning: encouraged by considering how trading beyond territorial borders can deliver long term efficiency improvements that will bring benefit to customers, water companies and the broader community alike.

Improved and active customer engagement: *strategically* focused, in assessing and evaluating business plans and development programmes; and *locally* focused, in considering issues that have a direct local or community impact.

Improved customer efficiency: encouraged by placing affordability at the heart of decision making. This includes the introduction of price limits for wholesale and retail services, and the introduction of innovative tariffs that support all segments of society.

MAKING VISION A REALITY

Doing the same things will bring the same results. Accordingly both industry and consumer alike will have to accept that wholesale changes are needed, and should be welcomed, in meeting today's challenge. Without this buy-in, there is a risk that implemented changes will fall short of the targeted outcomes and what is needed to support our economy and sustain our society.

Thankfully, our increasingly *instrumented*, *interconnected* and *intelligent* world provides ample opportunity to innovate and provides more options for those considering how best to respond to this change.

We have identified six imperatives that could help the water industry to turn this vision into reality.

1. Turn information into insights:

We are all overwhelmed by data, but this can be turned into valuable insights. Analytics and optimisation solutions can: clarify the relationship between demand and supply; establish where cross-boundary trading offers the potential for long term benefit; develop better abstraction regimes that will improve the long term health of our river catchments; and produce a better understanding of leakage, asset conditions and the risk of supply interruptions,



thereby focusing scarce resource where it is needed most. For example, IBM worked with the Marine Institute in Ireland to create an environmental monitoring programme in Dublin's Galway Bay called "SmartBay". It was designed to collect volumes of raw data via sensors and turn them into intelligent information in real-time, delivered to multiple stakeholders via the internet.

The data being collected covers everything from coastal conditions to pollution levels, water quality and marine life. This is shared with public health agencies monitoring water quality and researchers studying environmental issues in the area. It gives commercial fishermen a direct channel to the harbour master, transmitting everything from tidal and weather conditions to potential hazards in the bay, providing estimated arrival time to local fish markets, and information to tourists visiting the area.

2. Drive operational effectiveness and efficiency:

There is continued demand to do more with less, to support continuous improvement and to drive the efficiency agenda. The proposed introduction of price limits prompts even sharper focus in this area. Those organisations that are able to develop a more detailed understanding of production, network and retailing costs; make the link with service levels and desired outcomes; and do so in real or near real time will clearly have greater scope to drive operational effectiveness and efficiency.

3. Connect and empower people:

Developing collaborative strategies and linking interested stakeholders in local initiatives such as Catchment Management Plans presents both challenges and opportunities. Synthesising and communicating information simply and presenting it in compelling ways to disparate groups brought together on common collaborative platforms will be key to meeting this challenge.

IBM has worked with the Sonoma County Water Authority to help establish a more collaborative approach to the management of the Russian River catchment. The catchment is a microcosm of California, characterised by increasing domestic, industrial and agricultural demand, and constrained by limited water storage in a drought prone region. Balancing demand and supply in an orchestrated way to safeguard the ecology of the river catchment presented a very real challenge.

The solution combines a centralised operational centre with a collaborative platform that shares information on flows, pressures, reservoir and river levels, as well as water quality, alerts, alarms and bulletins, with a wide variety of interested stakeholders including water retailers, industrial users, the vineyards, tourism agencies and the environmental protection agency.

4. Enable service innovation:

Our individual perception of customer service is informed by our experience in other sectors – retail, banking and telecommunications. By offering a more personalised service in which customer profiles and histories are known, preferences are understood and customer facing staff are better informed of specific service issues, customer service levels will improve as will service level compliance.

5. Increase agility:

Organisations that become more agile, innovative and fleet of foot have an opportunity to outpace the competition and lead their industries. For the water industry, operational resilience is key. Better real-time monitoring of the water production processes; the ability to compare actual against designed performance criteria; and the ability to make dynamic adjustments to individual systems will help generate agility, optimise performance and build greater operational resilience.

IBM is applying advanced hydraulic modelling techniques, weather simulation modelling and high speed computing to better predict the behaviour of the Guadalupe River in Texas at more than a hundred times the normal speed. The modelling extends to the extensive network of smaller feeder tributaries, which have been historically ignored, resulting in more accurate flood mapping, including where flooding actually starts and where flash floods threaten populations and critical infrastructure. This provides practical support to the municipalities and disaster response teams responsible for both steady-state and emergency planning, and takes the pressure off resources when they are most needed.

6. Manage risk and compliance:

As regulatory intervention adopts a more risk-based approach, it will become increasingly important for water companies to help consider what systems, process and governance they need in order to identify, monitor and manage the risks they face, and to provide the requisite confidence to their shareholders, regulators and customers. As the UK's water regulators and the public at large increase their scrutiny, so too should the industry up its game.

Water concerns us all; it's key to our environment, our economy and our society at large. In a complex and resource-constrained world it has become increasingly important to ensure that the decisions we make are made in the best interests of our environment, our local communities, our consumers and our economy. IBM's smarter solutions can help to bring people together, help visualise and make the unseen seen, help optimise and improve efficiency, help make the right decision faster and help turn the tide.

£960_m
could be saved by the
UK water industry
through improved
interconnection⁴



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