

C4

Bristol Water... Clearly Resilient




BRISTOL
WATER

Structure of our Business Plan Submission

Appointee plan

A1
Bristol Water For All



A2
Customer summary



Wholesale controls

B1
Water resources



B2
Water network plus



B3
Residential retail



Supporting evidence

C1
Engagement, communication and research
—
Engagement Summary

C2
Addressing affordability and vulnerability

C3
Delivering outcomes for customers

C4
Bristol Water... Clearly Resilient

C5
Cost and efficiency
—
Investment cases

C6
Financeability, risk & return, and affordability

C7
Track record of delivery

C8
Securing trust, confidence and assurance

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Purpose of this document

Section C4 forms part of the **supporting evidence** for our business plan. It is the main source of evidence for the following Initial Assessment of Plan (IAP) tests:

IAP Test area	Questions	Evidence provided in this document
Securing long-term resilience	LR 1 How well has the company used the best available evidence to objectively assess and prioritise the diverse range of risks and consequences of disruptions to its systems and services, and engaged effectively with customers on its assessment of these risks and consequences?	In this document we set out how we have used variety of methods to assess different types of risks and opportunities to our services. We also set out how customers and stakeholders have helped us to identify risks and their consequences.
	LR 2 How well has the company objectively assessed the full range of mitigation options and selected the solutions that represent the best value for money over the long term, and has support from customers?	In this document we set out how our future plans have been founded in long term planning and co-created with our customers. We set out how our approach delivers best value over the long term. Our resilience maturity assessment measures the benefit of our plans to overall resilience.
Targeted controls, markets and Innovation	CMI 1 How well does the company's business plan demonstrate that it has the right culture for innovation which enables it, through its systems, processes and people, to deliver results for customers and the environment from innovation?	In this document we set out our company innovation framework and describe how we have fostered a culture of innovation within the company.
	CM2 How well does the company use and engage with markets to deliver greater efficiency and innovation and to enhance resilience in the provision of water and wastewater services to secure value for customers, the environment and the wider economy; and to support ambitious performance for the 2020-25 period and over the longer term?	In this document we set out our market innovation framework and how this links to resilience. We also include a case study on the potential for water resource trading (West Country Water Resources).

1 Introduction

This document provides an update to the resilience and innovation components of *Bristol Water... Clearly*, published in February 2018. It summarises our **resilience strategy** for achieving our long-term ambitions and outlines our approach to **innovation**.

We believe that resilience and innovation go hand in hand. Long term success depends not only on understanding risks and managing them but also on proactively identifying cost effective solutions and opportunities.

When Bristol Water was first formed in 1846, it was a pioneering enterprise to bring clean supplies of water to the City of Bristol from a long distance away from the city. This involved a number of innovations which provided the city with resilient and affordable water supplies for the future generations. Over the last 170 years, the needs and expectations of the communities we serve have changed significantly and we will also face many new challenges in the future. We must continue to plan for the long term and find new ways of doing things to continue our legacy of resilience.

The main principles of our approach to resilience and innovation are summarised as follows:

Customers at the heart of everything we do

Organisations who want long term success must put their customers at the heart of everything they do. Resilience has been a key area of focus for our customer engagement, and this engagement has

ensured that our plans are focused on a shared understanding of potential risks and challenges. **Chapter 2** of this document explains how our customer engagement has defined our customer priorities and informed our strategies for resilience.

Four strands of resilience through our resilience framework

Our framework covers operational, service, corporate and financial resilience. This is set out in **Chapter 3**.

Our approach to delivering long-term operational resilience is holistic, focusing on **response and recovery** actions as well as **redundancy and resistance** solutions. **Chapter 4** explains how we achieve this balance.

In order to deliver customer priorities in our resilience strategy, we have introduced the concept of **Service Resilience** described in **Chapter 5**.

Corporate resilience is essential to maintain customer trust. In **Chapter 6** we set out how this is the ability of our governance, accountability and assurance processes to help avoid, cope with and recover from disruption of all types.

In **Chapter 7** we describe how we need **financial resilience** to maintain focus on long-term improvements while maintaining affordability for our customers.

Resilient communities and resilient environment

The foundations for a Bristol Water that is **'clearly resilient'** stem from our region's people and culture. We recognise the importance of working in partnership with our customers and stakeholders, and we know the steps we can take to play a key role in supporting a **resilient community** and contributing to a **resilient environment**. This approach and ethos is described in **Chapter 8** of this document.

Maintaining resilient services

In **Chapter 9** we set out how we will maintain and enhance resilience through our plans. We include a resilience maturity assessment in **Chapter 10** to quantify improvements.

Cost effective resilience through innovation

Innovation is the key to finding cost effective solutions to meet our resilience challenges and to take advantage of opportunities. We will need to **innovate**, challenge conventional wisdom and do things differently. Resilience through innovation will guide the way we think, the way we plan and the actions we take to achieve our long-term goals. **Chapter 11** of this document describes how we use innovation to deliver cost effective resilient solutions.

2 Customers at the heart of resilience

Resilience is a key issue for our organisation and the communities we serve. It allows us to build trust and deliver customer excellence - our top priority.

What our customers have told us

Chapter C1 of our plan explains how we have listened and worked with our customers to develop our plan. Through the first phase of our customer engagement (focus groups, collation and review of day-to-day data, and online surveys) it was apparent that a **reliable and high-quality water supply at an affordable price** continues to be their top priority.

Resilience is a challenging concept to engage on with our customers because it is a characteristic of the service we provide, rather than a tangible outcome that our customers' experience such as high-quality water. Ofwat defines resilience as: ***“the ability to cope with, and recover from, disruptive events to maintain services for people and protect the natural environment, now and in the future”***.

We have worked hard to ensure that our engagement addresses resilience in ways that our customers and stakeholders can relate to. We used games and scenarios in a way that brought the subject to life and enabled customers to understand and share their views. As shown in the video that accompanies our plan, the customers engaged in co-creation of the future of their water services felt a sense of shared ownership for the outcome.

Because our customers prioritised reliable, high-quality water, we focussed on inferring views on resilience in the context of incident response,

drought avoidance and water resources. We used a variety of methods, varying in scale from large deliberative events and online surveys to in-person interviews - aligned to the Futures, Action, Community and Experience model presented by Ofwat in **Tapped In**. The following research reports within the appendix to document **C1: Customer engagement and research** provide further detail:

- B11: Exploring deliberative resilience research
- B17: Co-creation workshops with stakeholders
- B19: Company financing and bill impacts deliberative events

F FUTURES:
customer participation to improve the current and future sustainability of water in the lives of customers.

A ACTION:
customer behaviour change actions, including saving water and helping to reduce sewer blockages.

C COMMUNITY:
community ownership of particular aspects of water as an essential resource.

E EXPERIENCE:
increasing customer control of water in their home or of the customer service experience.

While customers are generally understanding of one-off incidents, they do want us to prioritise improving our response to them. Water quality and reliability of supply continue to be key issues, particularly our response to one-off events. Support for our efforts to improve environmental outcomes and to contribute to the local community is strong; reflected in our outcome of Local Community and Environmental Resilience. Our customers place a high priority on our ability to cope with unexpected events, and we therefore need to continue to focus on **operational and service resilience**.

When we talked to customers about securing adequate supplies of water in the long term, they told us that we should prioritise reducing demand before increasing supply; leakage management and water efficiency are the key mechanisms which customers want us to use in order to reduce demand. Our customers also told us that they were keen for bills to stay low and steady, that borrowing was favoured only when it helped keep bills low, and that we should aim to pay off investment during the lifetime of the assets in question. As we seek to maintain our **financial resilience**, we therefore need to focus on delivering our services more efficiently, ensuring that our financial position allows us to deliver long-term improvements whilst also coping with short-term events.

Other priorities identified from engagement include:

- Water efficiency as a shared stakeholder priority;
- For developers price is important, but not at the expense of choice of service;
- Environmental stakeholders are keen to see us lead in environmental sustainability, which in turn supports community wellbeing;
- Communicating more clearly to customers about the recreation opportunities provided by our reservoirs, while ensuring we balance increasing access with protecting wildlife; and
- Customers increasingly want us to go beyond providing tap water. Improving environmental outcomes and contributing to the local community are areas of customer interest – reflected in our outcome of **local community and environmental resilience**.

These observations highlight that as well as providing reliable and high-quality water supply, we must support local communities by balancing the priorities of different stakeholders, by delivering environmental outcomes and by providing opportunities for recreation.

We are proud that our customers have voted us the most trusted UK utility company and the best water company for customer service for the second time in a row. We want to build on this success, and that is why, as part of our business plan, we aspire to be the top performing utility company.

Spotlight on engagement on resilience

We have been innovative in the way that we have engaged with our customers on long-term resilience issues.

At our deliberative workshops on 'exploring resilience', we used a 'top trumps'-style budgeting exercise to investigate customer views on the trade-offs between short and long-term resource options. Participants in the workshop were able to discuss and give their views on various options available to the company, both individually and in groups, before they were introduced to the trade-offs on the reverse of the cards and asked to re-evaluate their initial choices. We conducted a mini-valuation exercise on voting key pads at the start of the day and at the end of the day. This helped us understand how customer's views and preferences on long term resilience options differed as a result of becoming more informed about the complex

choices water companies face between alternative means of maintaining the supply-demand balance.

Results showed that customers' overall willingness to pay did not change significantly during the course of the event. The analysis also suggested that customers were willing to pay more to reduce leakage and less to improve the environment.

Our resilience cost study focused on long-term resilience issues by valuing the avoidance of severe water usage restrictions to inform our Water Resources Management Plan. The study was conducted by asking businesses to estimate the amount of economic output that would be lost following a severe water use restriction, in order to identify the potential economic loss due to drought for the Bristol Water supply area.

Our approach to obtaining customer valuations through willingness to pay (WTP) research, revealed preference research, and our slider game demonstrate a step change in how we are engaging customers where complex choices and trade-offs between the service we provide and the impact on their bill are concerned.

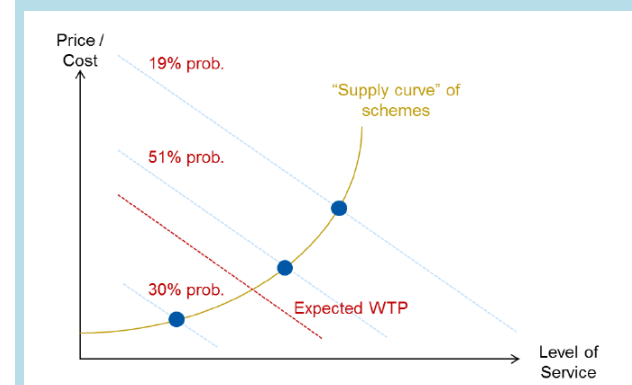
Our willingness to pay surveys used a new and more innovative approach to the valuation of water services than was employed for our PR14 business plan. The methodology used in the research is essentially a combination of:

i) A form of best-worst scaling (the maximum-difference (MaxDiff) scaling method) in order to estimate relative utility weights between relevant attributes; and

ii) A sequential contingent valuation exercise (package approach) in order to estimate the total WTP for particular packages of attributes, with respondents asked to perform valuations of packages.

This is an innovative alternative to the standard approach adopted for PR14, and it has been peer-reviewed by an academic who has applauded its strengths - including simplification of the survey for customer completion. In addition, this approach has arguably led to more robust valuations.

We developed an approach to triangulate WTP values by testing how priorities for improvements changed for different segments of our customers, by way of alternative "starting" levels of the bill. This allowed us to test how price-sensitive customers were at different levels of cost and quality, which in turn allowed us to infer for each customer segment the acceptability of our plan at different price levels – this was important to resilience as it formed part of the information which the Board used to balance decisions on risk and return.



3 Our resilience framework

Resilience is particularly important to the water industry because our services are so critical to public health, the economy and the wider environment. To ensure that we maintain excellent services in the face of disruptive events, we require:

- A thorough understanding of the needs of our customers and stakeholders, so that we can that ensure our services meet these needs;
- The trust of our customers and stakeholders, built by excellent service and event response;
- Clarity on how our assets function and how assets are used to prepare for and respond to events;
- The financial resources to maintain long-term focus even as we deal with short-term events; and
- The corporate agility to deliver excellent experiences for our customers, and be able to respond to events quickly and safely.

What we have already done

A lot has changed since our last strategy *Water in the Future* was published in 2012:

- We have become more efficient and cut costs by being innovative in how we work;
- We have used a variety of methods to listen and respond to our customers' views. We will balance supply and demand by innovating to reduce leaks and to promote water efficiency;
- There have been significant changes to our Board and most of our leadership; and

- Our investors have changed, which has renewed our focus on what matters most - customer trust, and a sustainable long-term business.

Resilience planning is not new for Bristol Water. Over the past 10 years, we have invested in many initiatives to improve our resilience, for example:

- Our risk management procedures help us to understand regional challenges and the role of water services for community resilience;
- Our Water Resources Management Plan outlines how we will ensure long-term maintenance of service, encouraging demand-management options ahead of major capital investment; and
- We support industry research into resilience and collaborate in UK Water Industry Research resilience studies.

Notwithstanding these advances, we recognise that resilience risks are dynamic and can change quickly. We must regularly revisit our existing plans in order to identify new and emerging risks - to ensure that we remain prepared. Innovating in how we manage risk, and in how we design and deliver schemes, will be particularly important. We have developed a **Resilience Framework** to guide our strategy. This framework:

- Links our customer priorities and outcomes to the four elements of resilience; operational, service, corporate and financial;
- Uses Ofwat's seven resilience planning principles;
- Helps to identify and categorise resilience risks, and to ensure that we consider a broad range of options to deliver best value solutions; and

- Highlights the importance of innovation, transformation and continuous improvement to all components of resilience.

Our framework separates operational resilience (focused on the functioning of our assets and our stewardship of natural resources) from service resilience (how the operation of these assets and our management of resources translate into customer experience). We have done this because how we serve our customers when they are most vulnerable is a key part of our being trusted. It also recognises the role that people play, both in resilience-planning and recovering from events. Our Resilience Framework helps us to deliver on the expectations of government and our regulators. It addresses:

- **Cabinet Office** guidance on infrastructure resilience via the 4 R's of Resistance, Reliability, Redundancy, and Response & Recovery;
- **Defra** expectations in its Strategic Policy and Objectives Statement, and its requirements related to security and emergency measures;
- **Ofwat's** Resilience in the Round ethos, acknowledging that our service delivery relies on operational, corporate and financial systems and ensuring we plan in accordance with the **seven resilience planning principles**;
- The expectations of **Natural England** and the **Environment Agency** to enhance the environment, improve resilience, and operate to best protect people and the environment; and
- Our commitment to full compliance with our statutory obligations for drinking water, governed by the **Drinking Water Inspectorate**.

Our Resilience Framework also aligns with the thinking of our regional partners, such as the West of England Combined Authority (WECA) and Bristol City Council. We aim to work together with such partners to deliver **local community and environmental resilience** which empowers people and businesses, and protects and enhances the environment.

A summary of our business plan within this framework is provided in Figure 1 below.

In **Chapters 4 -7** we cover each aspect of our resilience framework (operational, service, corporate and financial). These together deliver local community and environmental resilience, covered in **Chapter 8**.

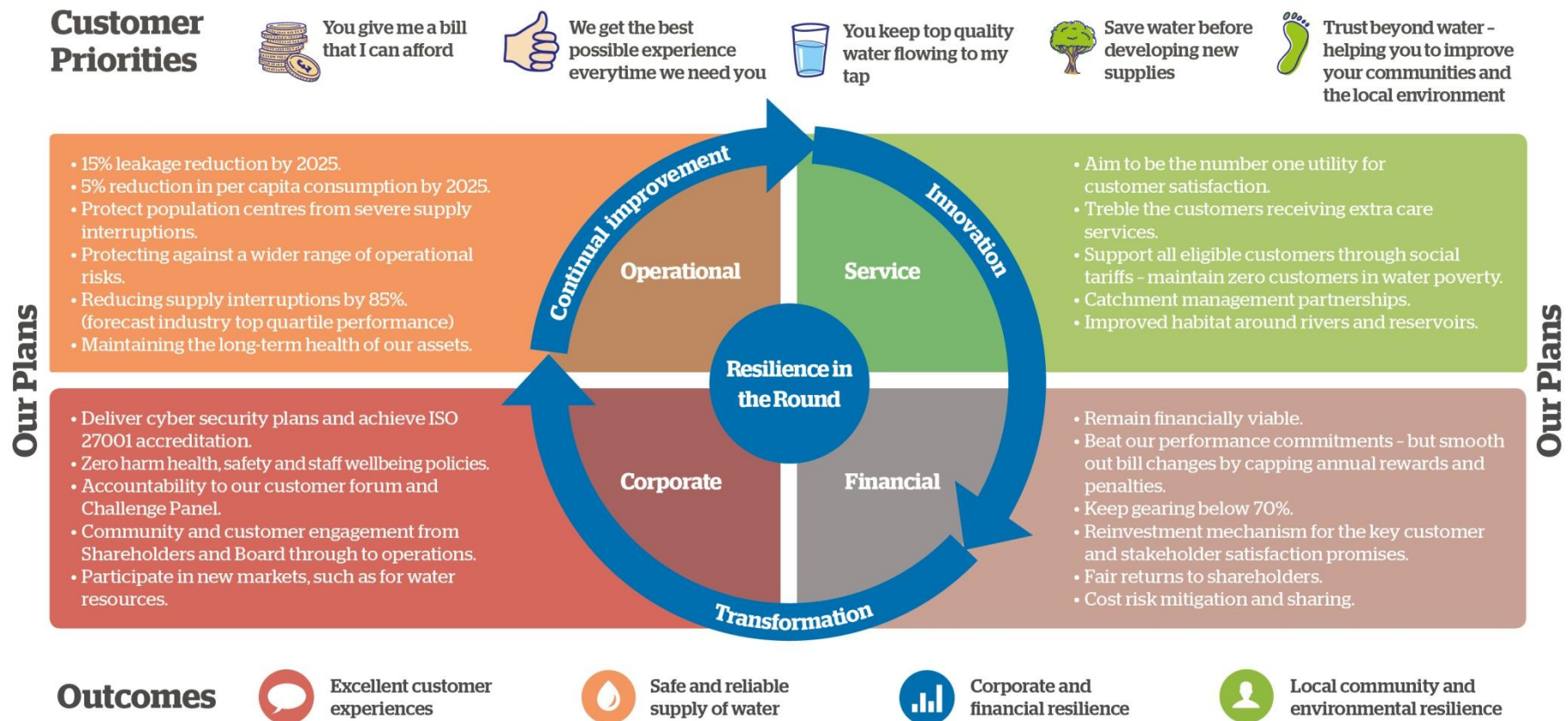


Figure 1: Our Resilience Framework

4 Operational resilience

What is it?

Operational resilience is the ability of our infrastructure and use of resources to avoid, cope with and recover from disruptions to performance.

Operational resilience therefore relates primarily to our physical assets, and focusses on hazards such as intense weather and asset failure. It includes the assets themselves, and the skills and systems required to operate them. It also relates to our stewardship of natural resources and the environment.

Why is it important?

Operational resilience ensures we can continue to provide clean water to our customers. It enables us to achieve our customer priority of providing top quality water, and to deliver on our outcome of **Safe and Reliable Supply of Water**.

What are the key challenges?

Delivering operational resilience requires us to consider both external and internal threats - effective risk-management is therefore key to building operational resilience.

One major external threat is climate change and extreme weather; from the potential impacts of warmer temperatures on water quality, to the effects of freeze/thaw on the condition of our pipes. We need to maintain effective asset monitoring systems, tools to help us predict failure, and the procedures to respond at the most appropriate time.

We can deliver resilient infrastructure with:

- **Redundancy** - to provide backup capacity;
- **Resistance** - to provide the protection to resist the hazard or its primary impact;
- **Reliability** - to ensure that assets can perform under a range of conditions; and
- **Response & Recovery** - to ensure fast and effective response.

To provide robust solutions, our plans need to combine all four activity types. We also need to nurture the skills and capacity of our staff so that they can respond effectively when required.

What are we doing about it?

Systems thinking

Our approach to operational resilience focuses on understanding our assets and their importance to service delivery at a systems level. This means thinking about the role of a given asset in context of the broader water supply network, not just the site in which it is located. By considering this system criticality, as well as the asset's condition and performance, we can analyse data to identify solutions which deliver maximum value to our customers. Our approach to managing assets in this way is aligned to best practice international standards (ISO 55001).

Our ability to deliver water supply resilience over the long-term is supported by our water resource planning process, which is informed by stakeholder views and customer engagement.

Our Water Resources Management Plan sets out how we will manage and develop water resources

in order to consistently meet our water supply obligations. Our approach considers the resilience of our entire water supply system and seeks to optimise its overall performance, rather than focusing purely on specific initiatives.

Based on consultation feedback, our plans focus on reducing leakage and water demand, and on optimising how we share water resources with neighbouring water companies.

Business continuity

Our business continuity planning includes policies and procedures for disaster recovery, severe weather, fuel shortages and other events to ensure that we can operate effectively should a significant disruption to our core business activities occur. A steering group ensures the necessary plans are in place and that sufficient resources are available for continuity planning.

In the event of a serious incident, we follow our Emergency Management Manual to ensure that we respond accordingly. We categorise incidents into three levels, with crisis at level 3. Each incident is appointed an Incident Manager, who reports directly to the CEO. Where there is a loss of water supply to homes, the Incident Manager will call on the deployment of alternative sources of water. This may be by the distribution of bottled water or the use of bowsers or standpipes.

If an incident includes serious threats to the company (a level 3 incident), a Crisis Management Team is convened, led by the CEO. In such incidents, and where necessary, we are able to

establish recovery arrangements at alternative company sites.

Security

The security of our sites is a key element of our resilience. Our security measures comply with the Security and Emergency Directions (SEMD) and our compliance with these directions is audited annually by Defra.

SEMD regulations require that, amongst other things, we have in place appropriate security measures at our operational sites, including CCTV and site access security; that we have suitably equipped accommodation to act as a command and control centre; and that we have trained and experience personnel. We provide training for select employees so that in the event of an incident, they know what to do.

Case Study: The Southern Resilience Scheme

The Southern Resilience Scheme is a £27m water infrastructure project that has provided improved security of supply to over 280,000 customers in Weston-Super-Mare, Cheddar, Burnham and Glastonbury and the southern part of Bristol.

This new network gives us increased flexibility by allowing us to move water between our northern sources and southern region. It will also help us meet the increase in demand for water over the coming years, and it means if there is an emergency on one of our pipes we can get our customers back into supply much quicker.

We used our Biodiversity Index approach to ensure a positive impact on the environment, and we worked with Natural England to plan and deliver wildlife mitigation and enhancement.



Archaeological dig before the water main was laid

Case Study: West Country Water Resources

West Country Water Resources was formed in June 2017, to support a co-ordinated approach to water resources planning in the south west of England and neighbouring regions.

The group, currently comprising Bristol Water, Wessex Water, South West Water, Southern Water and the Environment Agency, collaborates to identify the best regional solutions to current and future water resource challenges.

The group has already provided evidence to support our 2019 Water Resource Management Plan and will now investigate the broader issue of potential water resource trading in the medium to long term.

This may include opportunities for the West Country to act as a potential donor region to boost the reliability of water supply in other areas of the UK that face a deficit.

Case Study: response to freeze/thaw

In late February and early March 2018, the UK experienced an extreme period of cold weather and heavy snowfall. The subsequent thaw had a severe impact across the country, with burst pipes resulting in over 200,000 customers across the UK without water from supply for more than four hours, with tens of thousands of customers, including some businesses and public services without mains supply for days.

Despite the severe weather, in our supply area less than 500 customers (0.08%) experienced supply interruptions that exceeded 12 hours.

We had robust processes and procedures in place to deal with this kind of operational event and we are pleased that Ofwat agreed that we performed well in response - that we minimised the impact on our customers, and kept our customers and stakeholders informed throughout.

Our response to this event demonstrates our operational resilience in production and network recovery, particularly through our advanced planning, processes and procedures, and our management response.



Case Study: water efficiency trials

We are working with the University of the West of England on a long-term project to gather data on water consumption in a student village.

This is the largest study of its kind in Europe and has provided us with valuable insight into a future generation of water users, and their water use habits.

We have also been trialling water efficiency products and water saving ideas in the UWE student village, and then measuring their impacts on water use.

This collaboration has improved resilience by raising awareness of water efficiency and by providing valuable data to aid our planning. It has reduced water demand, making our overall water supply service more reliable.



5 Service resilience

What is it?

Service resilience is the ability of our people and the business as a whole to always provide excellent experiences to our customers and stakeholders.

Service resilience goes beyond operational resilience to focus on the experiences of our customers, communities and stakeholders.

Why is it important?

Service resilience focuses on our customer priority of getting the best possible experience every time we are needed. Service resilience is therefore vital to ensuring that we can continue to deliver our outcome of **Excellent Customer Experiences** over the long term, and build community wellbeing and resilience to disruptive events.

Our customers' experiences are a key component of the expectations of our regulators, and it is not sufficient for our assets to be operationally resilient. For example, our legal obligations with the Drinking Water Inspectorate include the acceptability of drinking water to consumers. We use **Drinking Water Safety Plans** to consider public health and acceptability risks to consumers.

What are the key challenges?

Delivering service resilience requires us to consider how water supply supports wider societal benefits. It means we must collaborate closely with regional partners to both plan for and respond to events.

Customer experience is strongly influenced by our response to the moments when they contact us or need our support. Most customers are generally happy with the service they receive, although we can improve further by focusing on better-communicating information when service problems arise. Building on our performance also means we need to work with other stakeholders to highlight how our activities support the environment, and the wellbeing of local communities.

An important component of service resilience is responding to severe weather events. We use our Severe Weather Task Force to plan customer messaging and to investigate operational responses to severe weather, for example by making sure our treatment works can produce the amount of water required. Boosting water efficiency also supports operational resilience for dry weather, and this forms a key part of our Water Resources Management Plan and our Drought Plan.

What are we doing about it?

Collaboration and partnership working are the key enablers of service resilience - we will work ever more closely with our communities so that we can maintain a positive impact on society, the local economy and the environment.

Our close community relationships give us unique opportunities to support partnerships, such as the **Bristol Smart City** initiative; collaboration with research institutions and businesses will allow us to develop new technologies and approaches to delivering resilient and sustainable services.

Spotlight on: incident response

We pride ourselves on being agile and responsive to the needs of our local communities. For example, when we took the decision to issue precautionary 'boil water' notices to our customers in Clevedon, in early 2018, around 100 of our office staff including our Executive Team took to the streets.

Our team delivered the notice to all affected properties and provided bottled water to vulnerable customers within 24 hours. Not only did this mean that we responded quickly, but with our high-visibility clothing we provided a physical presence in Clevedon to field questions.

During the Willsbridge burst incident late on the 18th July 2017, we quickly mobilised a major incident response, notifying key agencies, the public, and other utility companies (such as BT and Western Power Distribution) in order to maintain public safety.

By the morning of 19th July, all affected customers had been notified and bottled water had been delivered to customers requiring additional support. Five temporary water supply locations were set up and frequently replenished in order to allow customers to take as much water as they needed.

These locations were staffed by Bristol Water employees, who gave updates to customers.



Case Study: Water Bar

Our pop-up Water Bar can be found providing free tap water and reusable bottles at local events such as the International Balloon Fiesta, Bristol Pride and the Festival of Nature. As well as reducing plastic use and keeping people hydrated, our bar provides the perfect opportunity for us to engage with our customers. We have used these opportunities on multiple occasions to ask customers about different elements of the service we provide.

It is not just us that think that our Water Bar is great - it won the Community Project of the Year award at 2017's Water Industry Achievement Awards; and Environmental Innovation of the Year at the Bristol Post Environment Awards in 2016. This year, the bar went to 13 events in Bristol and the surrounding areas.

In addition to the Water Bar, our refill stations can be found in businesses throughout Bristol. They are identified via an app and provide free drinking water whilst promoting the benefits of reduced plastic bottle use. Refill Bristol has been so successful that Water UK promotes it as a national initiative.

We also work with Sugar Smart Bristol to promote free tap water over sugary drinks.



Case Study: Sustainable water use

In partnership with the University of West England, Bristol Water has been awarded a research grant to contribute to the global research project SUNEX (Sustainable Urban Food-water-Energy NEXus).

The study aims to develop efficient solutions for the shared issues around energy, water and food supply services in urban regions.

The research program will provide a modelling framework to assess the food water energy system of an urban environment. The framework will be demonstrated in four case study city regions (Bristol, Berlin, Doha and Vienna) and will provide policy guidelines for different physical and climatic framework conditions and consumption patterns.

Through this research, we will learn more about how our water supply services can support the other resources that sustain community resilience. We can also contribute to the resilience of urban environments around the world.



Berlin



Bristol



Doha



Vienna

Case Study: Resource West

We recognise that a coordinated approach is the best way to tackle pressures associated with the increased use resources such as water and energy. In late 2017 we held a workshop with local and national stakeholders with an interest in working together to promote resource efficiency. We agreed to:

- Work with Wessex Water to understand our combined environmental impact and to consider joint messages on resource efficiency in our bills;
- Combine energy and water efficiency messages by partnering with local energy suppliers;
- Work with the Local Enterprise Partnership and WECA to link resource efficiency into regional economic, energy and industrial strategies;
- Encourage the formation of an active network between all utilities in the West of England, to share best practice on engagement and to build joint campaigns on resource efficiency; and
- Work with local partners to promote efficient water consumption by creating the messages and incentives to drive more efficient behaviour.



ResourceWest

Sharing knowledge. Taking action. Cutting waste.

6 Corporate resilience

What is it?

Corporate resilience is the ability of our governance, accountability and assurance processes to help avoid, cope with and recover from disruption of all types. Corporate resilience also enables our agility to create and take advantage of opportunities.

Corporate resilience relies on understanding how our physical and human assets interact, as well as understanding the influence of our stakeholders. Corporate resilience also requires a culture that supports innovation – this allows risks to be taken to create opportunities to grow and improve all aspects of resilience.

Why is it important?

Our physical assets cannot deliver excellent customer services without the help of our people. Sustaining corporate resilience therefore supports all elements of customer service – it is a vital enabler of **Local Community & Environmental Resilience**.

What are the key challenges?

Health, safety and wellbeing are a constant focus. Many of our activities have the potential to cause harm to staff, contractors and the public - we must always act safely, and maintain the wellbeing of our teams.

With health and wellbeing in mind, we can also support other aspects of resilience. For example, our response to the March 2018 freeze/thaw event

relied on our staff having the right skills and tools to work safely. Working safely also means collaborating with others, for example, by working with other utilities when we respond to incidents.

As we adopt new technologies, deploy more sensors and harness more data, our governance and assurance processes must evolve to keep up. We will need to progressively update our systems and use software to transform large amounts of data into information we can confidently act on.

We also face significant people and wider resourcing challenges which present a risk to the delivery of our future plans. In particular we recognise:

- The significant potential resource requirements of major schemes such as Hinkley Power Station, which may impact on our ability to resource our future programmes;
- The lower purchasing power of Bristol Water in comparison to other large companies, particularly important in a buoyant market. We use markets and jointly procure wherever possible in order to overcome this;
- The up-skilling of staff linked to our transformation programme; and
- Our ageing workforce, with potential loss of knowledge and skills.

What are we doing about it?

Our corporate resilience is founded on:

- Strong staff engagement, which enables effective workforce planning;

- Inclusive stakeholder partnerships, which support identification of risks and opportunities;
- Zero tolerance for health and safety failures;
- Improvements to our cyber-security;
- Strong quality management systems, aligned to international standards (ISO 9001);
- Efficient use of external experts to provide operational advice and to assure our plans; and
- An effective resourcing strategy.

Bristol Water is listed on the London Stock Exchange and complies with the UK Corporate Governance Code and Ofwat's Principles for Board Leadership, Transparency and Governance. This governance framework underpins Bristol Water as a successful and sustainable business. Committees established by our Board ensure that focus on matters such as executive remuneration, audit and control, and succession planning is maintained.

We are committed to go further in setting new standards in corporate governance. Our **Bristol Water for All** re-investment approach and our community satisfaction performance commitment help to ensure that our community ambition is delivered, and that our progress is transparent.

Our connection to the community we serve builds trust and is therefore a key part of our corporate resilience. Our engagement highlights the support our customers have for a local and accountable Bristol Water. We recently published a report (available on our website) with other small, local water companies highlighting how this type of water company can benefit customers in terms of corporate agility, customer services and innovation.

Spotlight on: resourcing strategy

Bristol Water's Resourcing Strategy focuses on attracting and retaining the skills needed to deliver excellent customer experiences in a rapidly changing industry. It has five key components:

- **Early Careers programmes** which include a talent programme for future leaders and the targeted development of technical skills;
- **Retaining high calibre** staff by focusing on engaged teams, operational excellence, a sustainable workforce and outstanding leadership;
- **Long-term arrangements** for contractors that are mutually beneficial;
- **Using a competency framework** to underpin talent development, acknowledging that staff are Bristol Water's most important resource; and
- **Working with partners and charities** to build skills in the community and to provide continuing professional development opportunities for our staff.

Spotlight on: cyber security

Ensuring that the data we manage is secure and that our systems are robust and safe is a key attribute for a resilient organisation. In turn, cyber security also supports operational and service resilience.

We are implementing a comprehensive Cyber Security Programme to:

- Understand our risk profile and define a prioritised (risk-based) action plan, linked to maturity and recognising the convergence between information technology and operational technology;
- Embed a cultural mind-set of information security, based on continuous learning, monitoring and improvement; and
- Complete Cyber Essentials+ and ISO 27001 certification to validate our strategies, systems and procedures. Cyber Essentials+ is a stepping stone on our cyber-security journey and we are looking to implement ISO 27001 management to support the obligations of the NIS Directive.



Spotlight on: health, safety and wellbeing

Health and safety is our number one priority. The message from the top of the organisation is loud and clear - health and safety underpins everything we do and must be inherent in our culture. An independent review of our approach was carried out in 2017, and a series of initiatives are in place to drive further improvement. These include:

- Director and leadership team safety inspections;
- Regular toolbox talks for staff to raise health, safety and wellbeing awareness;
- Company-wide launch of the 'Take 5 for Safety' to bolster safety messages to all staff;
- Working with our contractors to ensure we are aligned at all levels; and
- Launch of new site inspection, hazard reporting and improved lone worker systems.

All of our staff complete a health and safety induction programme, and ongoing training through the 'competent operator' framework.

We also encourage innovation in health and safety. One idea generated through an innovation exchange and now being deployed at our sites is the use of floating platforms to provide a safe working environment on water that is faster and cheaper to deploy than scaffolding.

The wellbeing of society is at the heart of our strategy, but for resilience it also applies to our staff. We recognise that stress and mental health can be one of the main causes of health and safety risks, and we have integrated this into our plans.

7 Financial resilience

What is it?

Financial resilience is our ability to avoid, cope with and recover from disruption to our finances.

Financial resilience addresses solvency, liquidity, risk management and long-term viability.

Why is it important?

We need resilient finances to maintain focus on long-term improvements, even as we deal with short-term events; while maintaining affordability for our customers. This will support our outcome of *Corporate and Financial Resilience*.

Financial resilience requires long-term investors who will support a business to improve, and who will in turn receive fair returns as the business thrives by delivering essential services to customers. Our financial resilience is supported by our shareholders, who have retained equity in Bristol Water rather than receiving dividends.

What are the key challenges?

Maintaining financial resilience is challenged by fluctuations in financial markets, and by the need to maintain focus on long-term investments and respond quickly to events despite this variability. To maintain financial resilience, we need to:

- Set ambitious service targets, with penalties for underperformance and earn reward payments from innovation, with fair shareholder returns;
- Push the frontier of innovation and efficiency;

- Maintain active and long-term investors, and an efficient balance of debt and equity; and
- Ensure we remain financially viable by careful stewardship of resources to maintain credit ratings that have headroom above investment grade requirements for unexpected events.

What are we doing about it?

Since our last business plan in 2014, we have a new (80%) majority UK shareholder (iCON Infrastructure). iCON has supported the business as it has transformed, with gearing falling from 71.5% in 2015 to 64% in March 2018).

Under the financial monitoring framework, we report on our solvency, liquidity, risk management, and long-term viability. We adopt a 10 year horizon to financial viability to describe risks to resilience, and our mitigations. This forms part of our annual report. In our annual Board Statement, we describe how funds have been considered and what our dividend and executive remuneration policy is.

To support our business plan, we have considered what risks are within our control, and proposed mitigation measures to address uncertainty. To further improve our financial resilience we:

- Will manage our finances carefully to maintain an investment grade credit rating;
- We will adopt Ofwat's gearing sharing mechanism which shares financial savings with customers if gearing increases above 70%; and
- Propose in our plan how we will mitigate the risk of a significant increase in the cost of our principle water resource.

Spotlight on: improving our efficiency

The innovations set out in *Bristol Water...Clearly*, have supported big improvements in efficiency. We have been rapidly closing the gap on wholesale costs to the leading companies, whilst continuing to deliver excellent customer services.

We benchmark ourselves against other water companies and utility companies, as well as looking outside of the sector. We also compare our costs to those incurred by utility providers in Europe, to see what lessons we can learn there. We compare well on many metrics, although energy use is higher - something we are seeking to address through energy-efficiency investment.

Bristol Water has an increased focus on alternative suppliers, and optimisation work and innovation is ongoing; for example, with power monitors being installed to characterise energy usage and provide management data. Our Energy Policy and Purchasing Strategy has been signed, and contracts have been established with chemical suppliers offering longer term security.

We have historically had efficient retail costs, in part because a joint venture with Wessex Water (Pelican) allows us to avoid duplicating customer contact and billing. Our view, supported by expert research, is that our retail costs remain among the most efficient in the industry.

8 Local community and environmental resilience

As a provider of an essential service, we recognise that our influence extends from providing safe water to individuals, through to supporting community wellbeing and economic prosperity. We have a social contract with our communities and by listening to our customers and working with our partners we can support the wellbeing of our customers, and our thriving and resilient region.

Local community and environmental resilience is one of the four key outcomes which we will measure our performance against. It recognises that the quality of the environment directly impacts upon the quality of the water we supply, and the wellbeing of the communities we work in.

Working together for a resilient future

We are a small, local water company and our agility helps us to innovate and change in response to our communities' needs. In recent years, we have cut costs and improved our services, optimised the way we work and improved the positive environmental impact of our activities. These changes have accelerated our journey towards customer service excellence, but we must continue to evolve to be responsive to the needs of our communities by collaborating with local government and business.

Resilience is an area where we have focused on co-creation with customers and stakeholders to ensure we build relationships and work together towards shared goals. We will encourage the formation of an active network with all utility

companies in the West of England to share best practice on engagement and build joint campaigns on resource efficiency.

We will work with local partners such as Knowle West Media Centre to articulate a vision of the positive life that can be achieved with efficient water consumption (110 litres/person/day). We will involve communities to create the messages and incentives that will lead to more efficient behaviour. Links with Bristol Smart City initiatives and the West of England Combined Authority (WECA) Digital Strategy will be made. Our work with an innovative Bristol-based environmental consultancy, Eunomia, will build a list of all the initiatives in the West of England that could be linked.

The operating framework of WECA sets out priorities for clean and inclusive economic growth, strategic infrastructure, world class skills and businesses that succeed. Bristol Water has a key role to play in all of these aims. Our water supply infrastructure is a critical enabler for healthy communities and businesses. We also need to grow new skills and promote business innovation to develop solutions to meet future demands.

Bristol City Council's 50-year Resilience Strategy presents a vision of "a liveable city of opportunity built on fairness and inclusion. A resilient city, both socially and environmentally, which offers prosperity for all." The components of the strategy: fairness, liveability, sustainability, agility and connectedness, link to our four pillars of resilience.

Case Study: a resilient Bristol

We proudly supported the Rockefeller 100 Resilient Cities project, working alongside local stakeholders to promote Bristol as a resilience exemplar.

Bristol's Resilience Strategy presents a 50-year vision of a flourishing city which inspires confidence in investors, with success shared by all. Its five components: liveability, fairness, sustainability, agility and connectedness, align to the four pillars of resilience Bristol Water is pursuing.



Fair

Every person living in Bristol has the assets and opportunities to enjoy a good quality of life.



Liveable

The city centre and neighbourhoods are great places for people of all ages to live, work, learn and play.



Sustainable

The city and region prosper within environmental limits through adopting new behaviours and technology.



Agile

Bristol citizens and leaders make agile decisions based on shared priorities and real-time information.



Connected

A strong network of local communities and organisations promotes trust, cooperation and shared action across the city.

Our engagement with the Rockefeller 100 project and with Bristol City Council has enabled us to build on existing strong links with local stakeholders, identifying where we can make a real difference to the communities we serve. One key issue is that economic and physical growth is currently coupled with growth in resource consumption. We can play an important role in resolving this issue, such as through *Resource West*.

9 Maintaining resilient services

Our plan for resilience is risk-based and forward-looking. It places customers and communities at the heart of an integrated approach to ensure that our operational, service, corporate and financial systems continue to deliver excellent customer experiences, now and in the future.

Our expenditure on assets, systems and our organisation is based on an appreciation of risk to service, the costs of managing those risks and their value to customers and the environment.

As part our business planning process, we have identified risks and trends that affect the four pillars of resilience and used these to prioritise the development and implementation of mitigation measures. We use horizon scanning to identify strategic, longer term resilience risks and opportunities as well as detailed assessment of operational, service, corporate and financial resilience to identify more specific risks and opportunities. We have involved our customers and stakeholders in the process of identifying risks, considering mitigation options and developing solutions. This process is shown schematically in Figure 3.

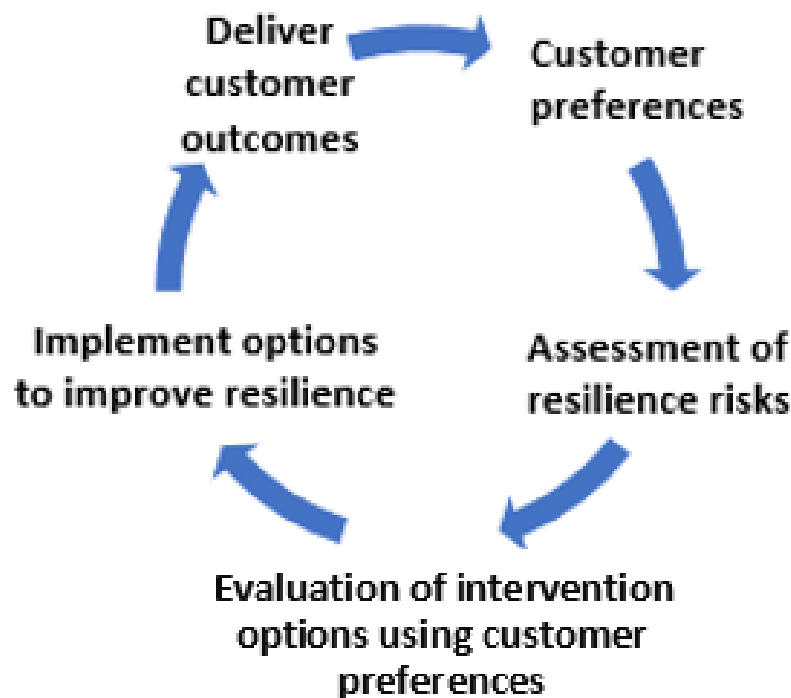


Figure 3: Translating resilience risks into solutions

Customer preferences

As discussed in Chapter 2, maintaining resilient services starts with an understanding of customer and stakeholder views. Through working with our customers and stakeholders, we have co-created long term resilient services.

Assessment of resilience risks

Using insights from horizon scanning to identify long-term challenges, and by harnessing the local expertise of our staff to highlight short-term constraints, resilience risks are captured in our Strategic Risk Register (SRR). The SRR collates risks which are identified and tracked by our various operations teams. Further information on our horizon scanning process is covered below.

Horizon scanning

Through dialogue with our partners, we have identified future factors and innovations that we need to consider, and which our stakeholders and customers expect us to address.

In total we have considered over 100 different future factors that could drive our strategy. This includes scenarios which are less probable but that have potentially large impacts.

We expect social factors to be the central external influence on our future plans, see Figure 4 for a schematic representation of these; and Figure 5 overleaf for a diagram which presents some of the key factors. Social factors are particularly important in sectors where customers do not have as wide a

choice about the services they receive. Our long-term strategy anticipates significant change in what customers expect from us.

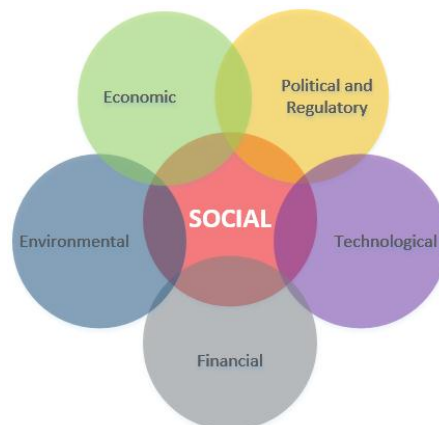


Figure 4: Social factors as the central external influence

As we plan for resilience, we need to regularly re-evaluate the risks we face. These include:

- **Extreme weather and climate change** – our WRMP explains how we plan for the worst historic events but we need to remain focussed on climate-risks such as the March 2018 freeze/thaw event. This also highlights our need to understand **asset health** and how it impacts on high impact, low probability risks. Our resilience performance commitment helps address this;
- **Environmental change** – our Biodiversity Toolkit helps us to understand and act to protect our environment. We need to innovate to identify other ways to limit environmental impact, for example associated with congestion;

- **Affordability** – by focusing on efficiency and financial resilience, we can reduce long-term costs to all our customers. In 2017/18 we achieved zero customers in water poverty, and we plan to expand our social tariffs further with customer support to address future social change;
- **Developing skills** – we plan for the future skills we need and use regional partnerships; and
- **Cyber security** – identified as a key global risk by the World Economic Forum.

Other important resilience hazards include changing technology and economic trends; technology affects the skills that our workforce need and the solutions that are available to us.

Our plans include measures to address all of these challenges. We also have procedures to ensure that we respond effectively to currently-unknown risks.

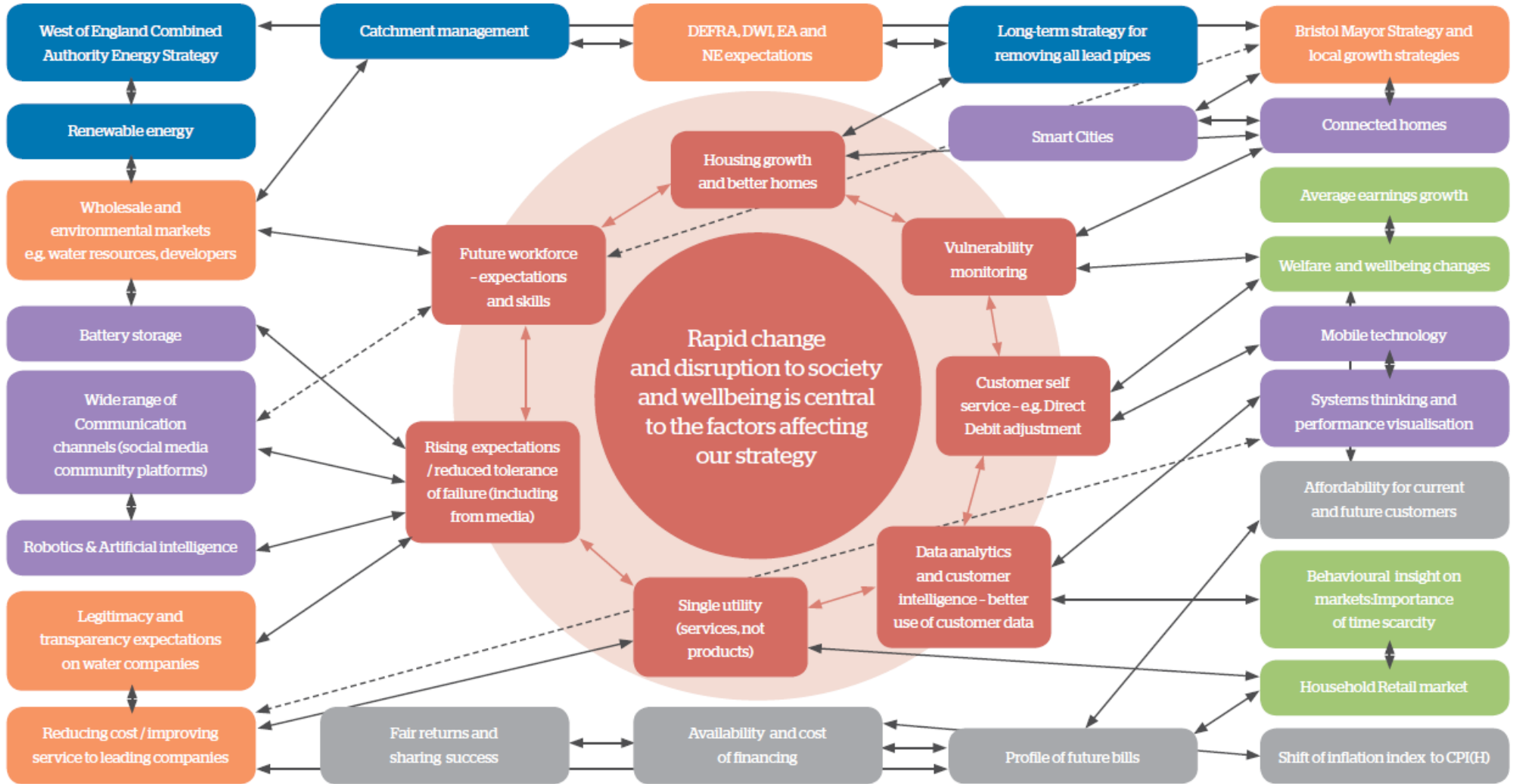


Figure 5: Some of the factors we considered when developing our future ambition and how these interlink

Prioritising Risks

Once identified and recorded in the SRR, we use data analysis and feedback from our customers to verify risks. This process also enables the identification of any additional risks. Our customers prioritised reliable, high-quality water supply; therefore we focussed on inferring priorities on resilience from perceptions of drought and water resources. Chapter 2 outlined what our customers told us. We then used these customer preferences to value, score risk likelihood and impact, and prioritise our risks for management.

Any risk with a score above a set threshold is taken forward for optioneering via a Needs Assessment. Risks to be addressed during the forthcoming 5-year planning cycle are used as the basis for our investment scenarios. Performance commitments are then mapped to these scenarios.

We also maintain a Corporate Risk Register which includes non-asset specific risks such as financial risks, supply chain risks, cyber risks, regulatory and legal risks and broader operational risks such as flooding and drought. Our four pillars of resilience are reflected in the register's sub-categories. The Board reviews this register to identify and act upon principle risks to ensure the long-term viability of the company.

Managing risk to provide best value

To deliver effective solutions for addressing resilience challenges, and to achieve our outcomes, we focus on understanding the nature of our risks and then systematically identifying and assessing the potential benefits of a suite of options. This

approach is embedded in our investment scenario development process and includes:

- Optioneering and Intervention Development – we consider the level of risk mitigation that an intervention provides, aligned to customer priorities and performance commitments;
- Intervention Costing – this includes describing interdependencies and control points;
- Benefits Quantification – in terms of contribution to achieving performance enhancement aligned to performance commitments; and
- Optimisation – the assessment and selection of interventions using constrained scenarios.

Implementing options

Our asset planners consider a wide range of options and initially develop a long list of options, influenced by the materiality of the business case. To ensure we capture a broad range of options we balance the **4R's of resilience** to manage overall system performance and deliver our performance commitments. In the past, we have been somewhat focussed on major capital investment, but now recognise that a more resilient long-term approach involves re-balancing the options which will support a more **adaptive** mix of solutions and help manage future uncertainties in a more cost effective and innovative way. We do this by considering hard and soft infrastructure options as well as how we can enhance procedures, plans and behaviour to improve performance.

Best value for customers

We deliver best value by ensuring our schemes are identified using a consistent risk-based process which enables needs to be prioritised, and costs and benefits to be quantified effectively. We then optimise the intervention programme to maximise whole life value, whilst ensuring our regulatory obligations are met and that our customers' bills remain affordable.

By developing our plan based on customer views, we can be confident that our plans deliver against customer priorities and provide the improvements which they most value.

Delivering customer outcomes

Our plan contains the measures we will implement and investment we will make to address our customers' priorities and achieve our outcomes.

Delivering on these priorities and outcomes requires resilient systems, and our plan therefore includes many measures that boost our resilience, both directly and indirectly. For example, over the next five years, our resilience will be enhanced by the following projects:

- Next phase of the Southern Resilience Scheme;
- Projects to support the local economy and community, such as Resource West;
- Asset management in line with ISO 55001;
- Environmental initiatives focused on catchment management and raw water quality, such as the biodiversity index;
- Ensuring we continue to have zero customers in water poverty; and
- Maintaining our 'most trusted utility' position.

Our “**Bristol Water for All**” wheel (below) illustrates how each of our three outcomes (*Customer Excellence, Safe and Reliable Water Supply and Local Community and Environmental Resilience*) can be linked back to promises, and ultimately customer priorities. We will use 26 performance commitments, aligned to the promises, to keep us on track. We will deliver our initiatives through a cycle of innovation, transformation and continuous improvement.

Our fourth outcome, *Corporate and Financial Resilience*, supports all of our promises by ensuring that our corporate and financial systems can avoid, cope with and recover from disruptive events. The table overleaf illustrates how our approach to resilience has improved through the current and previous price controls, and how this will continue to improve as a result of our plan.



Resilience	Past	Present - our journey to date	Our Future Plans	Our Measures
Operational Resilience	<ul style="list-style-type: none"> Plan relied on age based network replacement New reservoir proposed to deliver water resource investment Supply chain contracts focus on cost Track record of innovation through partnerships 	<ul style="list-style-type: none"> Network maintenance targeted at leakage and supply interruptions Successfully delivered 25,000 population resilience protection Performance on leakage, supply interruptions and metering require supply chain focus on delivery Good legal water quality and environmental track record Innovation platform driven by staff engagement. 	<ul style="list-style-type: none"> 15% leakage reduction by 2025 5% reduction in per capita consumption by 2025 Protecting all population centres over 10,000 people from severe supply interruptions over 24 hours by 2030 (around 550,000 people protected by 2025) Expanding the scope of our resilience scheme to protect against a wider range of operational risks Reducing supply interruptions by 85% (based on our forecast of industry top quartile performance) Asset maintenance programme to maintain long-term health of our assets 	<ul style="list-style-type: none"> Population at risk from asset failure Water quality compliance Supply interruptions Mains burst Unplanned outage Risk of severe restrictions in a drought Unplanned maintenance Leakage Per capita consumption
Service Resilience	<ul style="list-style-type: none"> High performance on SIM Higher than average bills Establish Pelican retail delivery with Wessex Early development of social tariffs 	<ul style="list-style-type: none"> Most trusted utility Top water company on UKCSI Effective incident response and recovery from customer perspective Zero customers in water poverty 	<ul style="list-style-type: none"> Transform our services, to keep pace with customer expectations and aspire to become the number one utility company for customer satisfaction as measured by the UK Customer Satisfaction Index (UKCSI). A programme of activities which benefit our communities, agreed and overseen by our stakeholders including improved recreation access at our sites, expanding public access to free drinking water, reducing traffic congestion, working with Resource West on resource efficiency messages. Linked to our 'Bristol Water For All' reinvestment mechanism. Triple the number of customers who receive extra care services through our Priority Services Register Support all eligible customers through social tariffs – maintain zero customers in water poverty Catchment partnerships to retain 531 kg of phosphorus which would have otherwise impacted water sources and treatment costs Improved habitat around rivers and reservoirs, equivalent to 5 hectares of high quality new habitat 	<ul style="list-style-type: none"> Customer and developer services measures of experience Percentage of customers in water poverty Value for money Percentage of satisfied vulnerable customers Raw water quality of sources Biodiversity index Local community satisfaction

Resilience	Past	Present - our journey to date	Our Future Plans	Our Measures
Financial Resilience	<ul style="list-style-type: none"> Gearing above 70% Industry efficiency outlier Historic debt cost above larger companies 	<ul style="list-style-type: none"> Gearing below 65% Appear to be upper quartile efficiency Historic debt cost has offsetting benefits and customer support Significant water resource cost risk Penalties from current performance in 2020-2025 	<ul style="list-style-type: none"> Remain financially viable Beat our performance commitments – but smooth out bill changes by capping annual rewards and penalties Seek a cost reduction rather than a cost increase for our supply from the Gloucester & Sharpness Canal. Share the risk with customers Keep gearing below 70% and share the financial benefits through lower bills if there is a good reason to go above this target Accountability: Bristol Water For All reinvestment mechanism for the key customer and stakeholder satisfaction promises Fair returns to shareholders 	<ul style="list-style-type: none"> Maintain strong investment grade credit rating Dividend and executive remuneration policy Transparency on fair returns to shareholders – annual “Trust beyond water” summary Annual Long-term financial viability statement Bills delivered in line with customer acceptability. Dividends reflect positive performance to customers - returns above plan benchmark of 4.5% can be justified.
Corporate Resilience	<ul style="list-style-type: none"> Three different investors with different priorities Data and information quality uncertain 	<ul style="list-style-type: none"> 80% shareholder with long-term focus Board and leadership strengthened Focus on customer and community for corporate governance 	<ul style="list-style-type: none"> Delivery of our cyber security programme and achieve ISO 27001 accreditation. Zero harm Health & Safety and staff wellbeing policies Accountability: Bristol Water For All engagement with our Customer Forum and the Bristol Water Challenge Panel People & Culture – community and customer engagement from shareholders and Board through to operational delivery Transformation programme – combining financial and service delivery Meet our “Develop our people and our business” objective to use changing utility markets to have a wider impact Engage effectively in new markets 	<ul style="list-style-type: none"> Company monitoring framework Employee engagement survey Best practice in corporate governance UKCSI Trust score – most trusted utility Reputation and stakeholder satisfaction – influence within and beyond water sector Leading wholesaler in business retail market performance metrics

10 Monitoring our resilience

We will monitor the performance of our business plan through our performance commitments are the service pledges we make to our customers and stakeholders. They allow us to track how well we are performing towards meeting our outcomes.

Several of our performance commitments focus on **operational and service resilience**, the aspects of resilience that our customers most readily experience. For each performance commitment, we set a target based on our customers' views. We also use a variety of other measures to track our **financial and corporate resilience**.

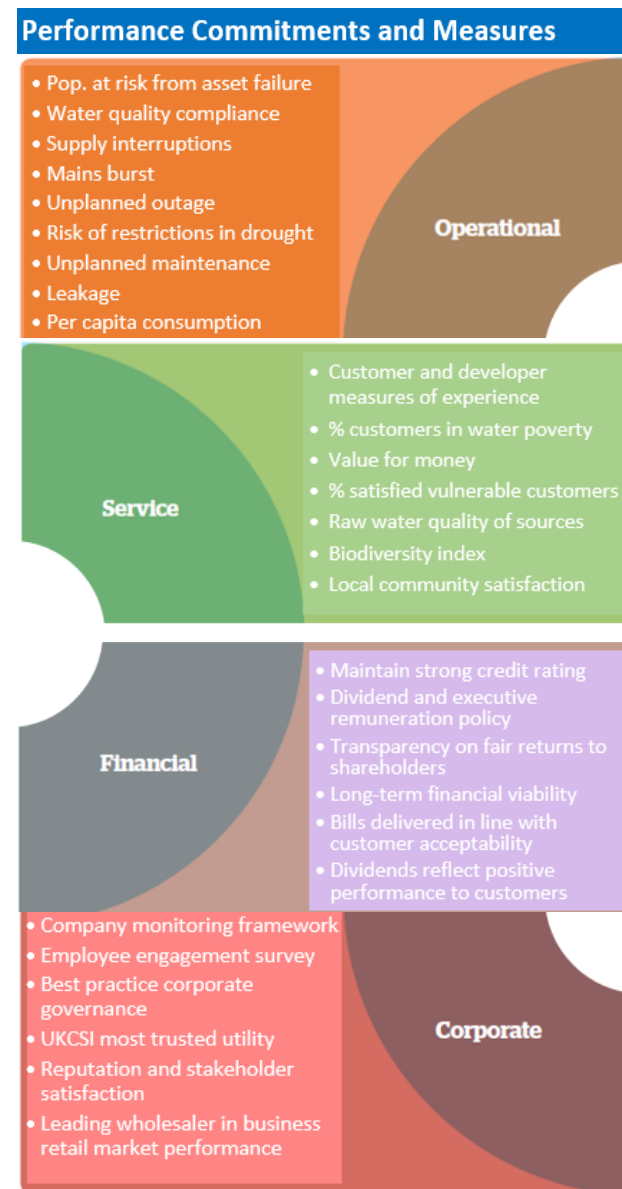
To understand the effectiveness of all our resilience initiatives, we have developed a bespoke performance commitment to understand Population at Risk from Asset Failure.

This performance commitment reflects a long-term ambition; to ensure that by 2050, issues with our critical assets (such as a key pumping station or service reservoir) will not affect population centres of more than 3,000 people for more than 24 hours. By 2030, our target is to protect population centres of greater than 10,000 people.

We have used detailed modelling to identify where the 2030 target is currently not met, and we plan to invest **£14m from 2020 to 2025** to support this aim, benefitting around 550,000 people. Further

investment will then be used over the next 5-year period to reach our 2030 target.

In addition to our performance commitments, we will use our resilience assessment tool to track improvements towards our AMP7 targets. Our maturity assessment using this tool is shown overleaf.



10.1 Our resilience maturity assessment

Our people, procedures, systems and infrastructure mean that we are already resilient to many of the challenges we face. However, we know that we can do more and we need to continuously improve as our challenges evolve.

To understand how well the characteristics and attributes of our organisation support resilient outcomes, we have developed a self-assessment tool to grade our current performance. Against more than 100 questions, each linked to one of our four pillars of resilience, we have scored our performance on a scale from 1 (Aware) to 5 (Excellent). Figure 6 shows where we consider our resilience approach to be most developed across operational, service, corporate and financial resilience. The figure also shows where we expect to be at the end of 2025 based on our future plans.

The results of the self-assessment indicate that we need to improve in some areas, such as in how we use the performance of existing and past projects to optimise what we do in future. We recognise this issue and believe it reflects historical challenges in capturing data and information to align experience to our resilience goals. We have completely refreshed our vision and strategy and have developed our organisation to focus on these challenges. This focus includes making sure we learn from our experience of implementing change. Our Transformation programme will improve all aspects of resilience.

As our resilience self-assessment shows, we are implementing a range of improvements which develop all of our four pillars of resilience.

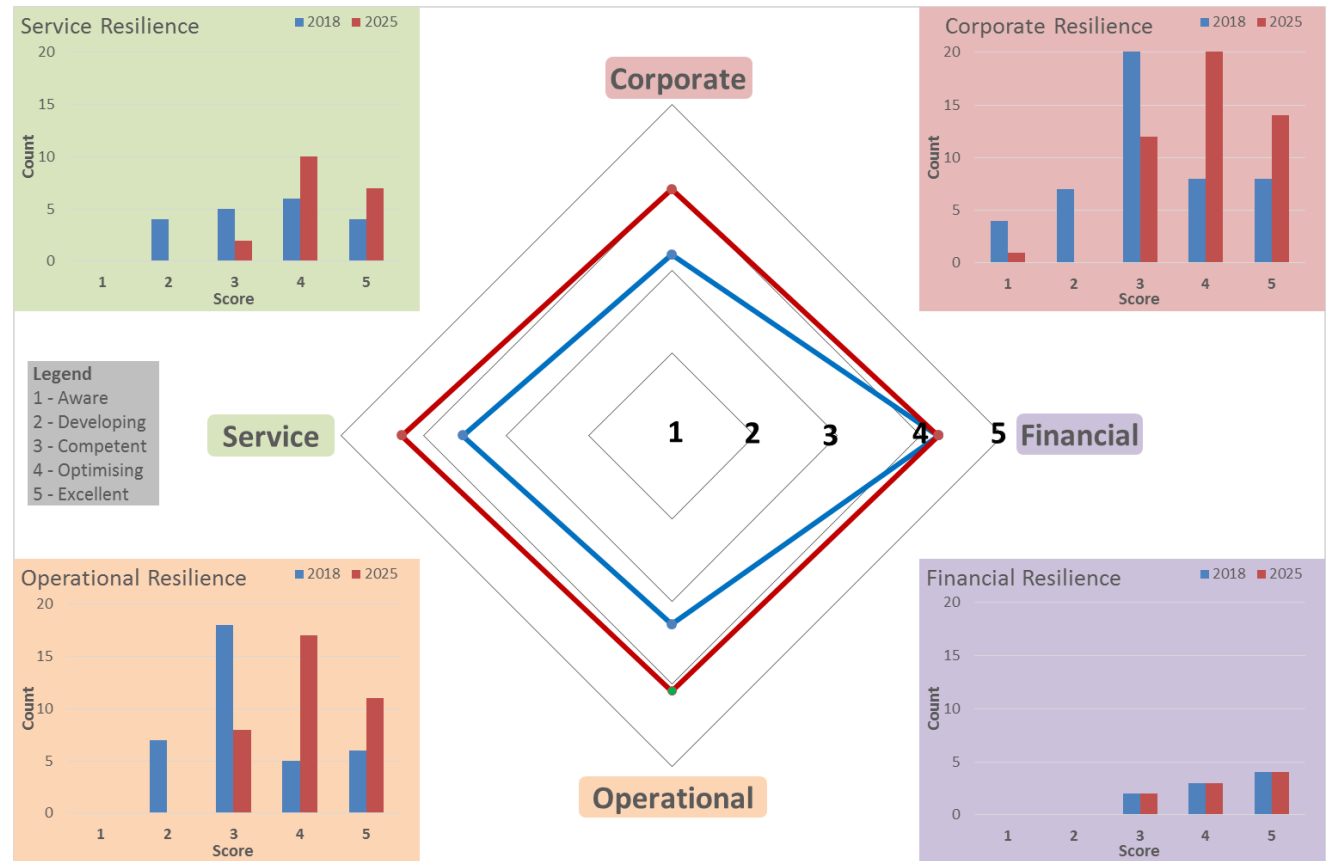


Figure 6: Our resilience maturity assessment

11 How we use innovation to deliver resilience

What innovation means to Bristol Water

Bristol Water has a **strong history of innovation** and this has had a wider impact on the rest of the industry. We take a structured approach to identifying innovations, supported by a transformation process that helps to implement innovation and realise benefit. We also seek continuous improvement via a daily focus on using innovation to improve our work.

Case Study: Ice Pigging

One of our most influential innovations has been ice pigging, the process of pumping an ice slurry into a pipe to remove sediment and other unwanted deposits. This technique was developed in partnership with Bristol University, and today has many applications in the water sector and is also expanding into other industries such as oil and food manufacturing. Our partnering approach to innovation continues to this day.

Innovation as a core business activity

Innovation is part of our everyday working. All the specialist teams that generate progress and change within our business feed innovations into their design processes, whether that be Asset Management teams looking to make interventions, IT reviewing our digital capabilities, the Customer team seeking to engage customers with the value

of water, or our Business Change teams pursuing efficiencies within our processes. We foster this spread of activities across our business, to allow an unhindered and independent approach.

Our Business Improvement and Innovation team also facilitate the strategic focus on the future innovations we pursue through the concept of Open Innovation: openly sharing key challenges with the wider community, in order to access the collective resources of entrepreneurs, academics, and supply chain, rather than limiting solution development to just our own research and development capabilities. Our Innovation Challenges (Figure 7) add focus to this process and reflect a combination of our four strategic objectives published in *Bristol Water... Clearly*, and our Technology Needs. Our Technology Needs are assessed through a series of workshops with our asset management teams, to explore where we

would most benefit from innovation.

All our innovations are tracked centrally by our Business Improvement and Innovation team to review how we are using innovation to meet our outcomes and strategic objectives, to assess how ambitious we are being, and to understand whether we are successfully bringing ideas to fruition. We produce a regular Innovation Health check to show how we are progressing (see example at the end of this document).

Our **Transformation function** works with our Innovation team, to manage a 'pipeline' of opportunity which could transform our business. The Innovation team is our 'eyes on the horizon', carrying out the initial testing of ideas in line with our business objectives. When these ideas reach a compelling level of maturity they move into the Transformation function for implementation.



Figure 7: Our innovation challenges

Our Innovation Framework

Our Innovation Framework ensures we put the right building blocks in place to steer and monitor innovation. It also ensures that we foster an innovative corporate culture from the ground up.

We steer and monitor innovation by:

- Maintaining clear policies and expectations;
- Being aware of innovative ideas by, for example:
 - Regular technology needs assessments; and
 - Relationships with industry bodies such as UKWIR, membership on the GDF Suez Technical Committee, and innovation events with British Water;
- Overcoming barriers to innovation; and
- Ensuring leadership oversight of progress.

Collectively, these activities help us identify where innovative solutions are required, to invite internal and external ideas and to pilot potential solutions.

We foster a culture of innovation through:

- Partnerships with research organisations, supply chain partners and academics (see Figure 8);
- Ensuring that staff have the resources and support to convert innovation into action;
- A network of innovation champions;
- The sharing of our successes; and
- Embedding the customer voice throughout our business, so that innovation focus is responsive to their priorities.

Case Study: Brainwaves

Brainwaves is the platform we use to transform many of our ideas into customer benefits. It is a forum for all employees to suggest ideas to make Bristol Water better - more efficient, more focused on our community, a safer environment to work in, a more engaged team, and a better place to work.

Brainwaves is run without constraint; ideas cover staff wellbeing, corporate social responsibility, asset optimisation, health and safety, and customer campaigns. Brainwaves rewards are focused on calibre and intent of the idea, not just whether it is implemented. This ensures that we celebrate any attempt to improve our company.

In 2017/18 more than 120 ideas were submitted and c.10% have been implemented, including the St John's Ambulance First Aid app, and the use of Biobullets to manage zebra mussels. This year we ran our first Brainwaves event; to celebrate everyone who has been involved, either through submitting an idea, being part of the Awards Team, or supporting investigation and implementation of ideas. Winning ideas included:

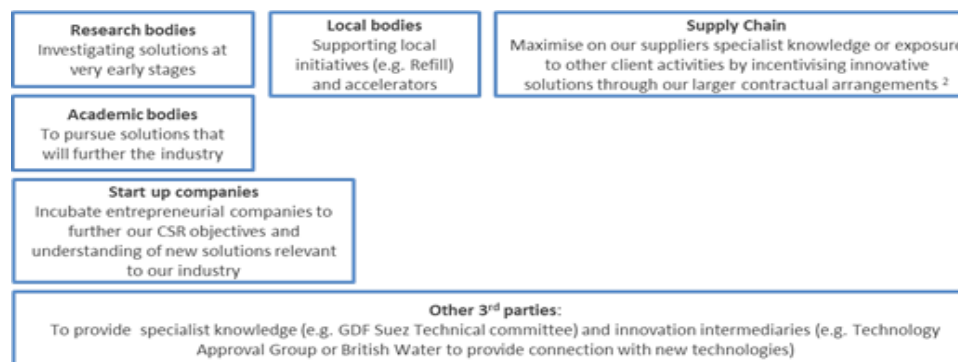


Figure 8: Our partnerships

- **Bristol Water Funding/Grant Appeal** - this idea considered how to set up a grant and invite local charities to apply for funding, driving our community objectives. We have since launched a Facebook community and a monthly draw giving local charities the chance to win £500.
- **Altering the way in which we conduct step testing** - this idea focused on how we could alter the way in which we conduct our step test process for groundwater sources, setting up the membrane plant in a manner that allows us to maintain set flows whilst still filtering the water and preventing the need for super and de-chlorination and crypto monitoring. This idea gives us great potential for cost savings and has since been implemented.

To keep Brainwaves fresh and relevant, this year we will be launching a page on our internal portal, Inflow. The homepage will bring together all ideas, create a forum with details of decision-making and reward allocation, and highlight our successes.

Open innovation

Open innovation is the way we share our innovation challenges with the wider community. We do this through a number of channels:

Market scanning: activities we undertake aligned to our technology needs in order to bring forward potential new solutions that we can feed into our business-as-usual asset planning processes.

Innovation events: last year we partnered with British Water to run an innovation exchange which invited a series of innovative suppliers to pitch their solutions to our innovation needs. Those of most promise were taken through to trial, including: a floating work platform to eliminate scaffolding requirements; under pressure pipe inspection technology; and low maintenance, bufferless chlorine and turbidity monitors.

Our website: we publish our innovation challenges on our website to continuously invite potential solutions, not limiting ourselves to specific events such as the innovation exchange.

Co-creation: a new initiative this year, we have established a business incubator to support start-up businesses that provide solutions which address our innovation challenges. All innovation requires investment, but not all innovations are monetary, and this mechanism provides an effective route for the business to benefit from innovation whilst also contributing to our local economy. It is also an environment that enables failure without penalty, where monetary investments inherently carry

more risk and can thereby reduce the opportunity for exploration in pursuit of a return on investment for customers and shareholders.

Examples of our recent innovations include:

- Technology for the near-real-time adaptive operation of our networks to improve resilience, leakage and incident management - from our partnership with Imperial College;
- The use of Bio-bullets to tackle zebra mussels, which can accumulate in large numbers and clog up filters at our treatment works. The Bio-Bullet has an inner centre that is toxic to mussels, but harmless to other organisms. The mussel-killing chemical is environmentally-friendly and fully approved for use in drinking water treatment.
- pontoons for working over water to reduce health and safety risks - Innovation Exchange;
- Robotic process automation to automate repetitive tasks; and
- Our pop-up Water Bar, which helps connect communities to water and to reduce use of plastics – winner of the Outstanding Innovation Water Industry Achievement Award.

Innovation in our Plan

Our Plan focuses on how we can use innovation to deliver cost effective and resilient solutions. We have sought to enhance our understanding of the performance of our networks and then to apply this understanding to deliver targeted schemes which deliver customer benefits which a resilient to

future challenges. Our bespoke resilience performance commitment (see **Section C3** of our plan) helps us to monitor how the resilience of large communities in our service area is improving.

The development of our plan has taken an integrated approach, built on a real understanding of what needs to be delivered. It is modest in terms of asset investment, recognising that we already have a central, integrated, view of the network.

For the specific investment cases within our plan we engaged a third party, Isle Utilities, to undertake a market-scanning exercise and identify where we can pursue likely future benefits. These activities ensure that we continue to push the industry frontier forward.

Isle Utilities undertook a review of our investment cases, prioritising focus areas according to the impact on outcomes, expenditure and the long-term ambition of the company. Within these focus areas Isle undertook a **market-scanning exercise** of technologies that we should aim to exploit in the next five years, in order to deliver the investments cases as effectively and efficiently as possible. We have used this work to drive ambition into our plans, as it enables us to plan for technologies that may not yet be commercially mature, but that we anticipate becoming so within AMP7. Their report has been provided for information and can be found as a technical annex to this chapter of our plan.



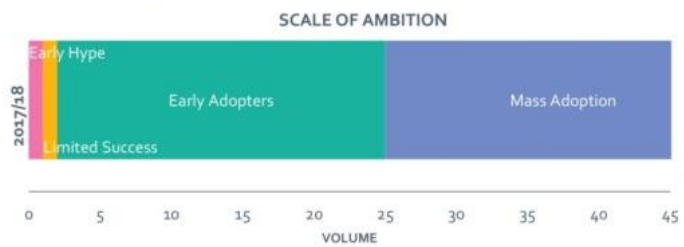
INNOVATION HEALTH CHECK - FY 2017/18

In 2017 we launched the Innovation Framework to facilitate and grow innovation activities around our company strategy. This report is a result of some of these activities.

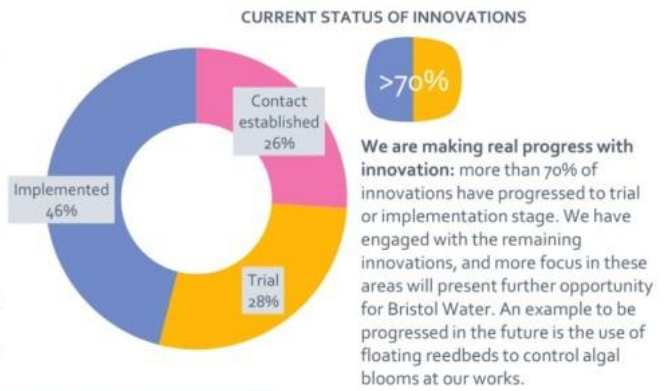
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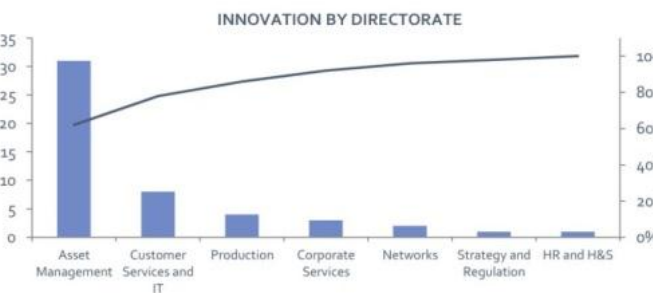
- Our **PARTNERSHIP** work with Imperial College has led to Dynamic DMA technology, a project that has recently been shortlisted for the Resilience Project of the Year.
- The 2017 **INNOVATION EXCHANGE** led to a number of technologies being taken forward, including Pontoon Works to reduce the H&S risks surrounding maintenance of our assets.
- We have introduced **ROBOTIC PROCESS AUTOMATION** to Bristol Water - this technology allows us to automate repetitive and manual tasks, saving hours of manual effort.
- We are starting trials later this year using BioBullets to control Zebra Mussels at our treatment works. This idea originated from **BRAINWAVES** and is an innovative way of controlling an invasive species.
- Bristol Water's pop-up **WATER BAR** won two awards at the Water Industry Achievement Awards, including "Outstanding Innovation".
- New **ELECTRIC VAN** introduced to our fleet



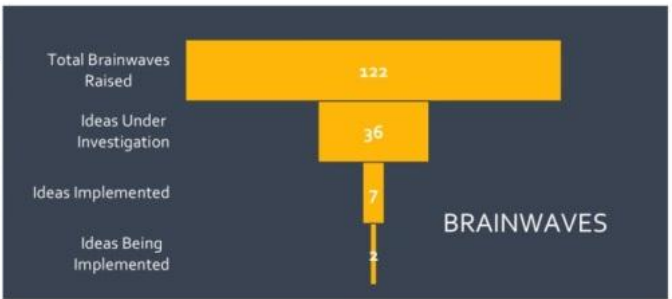
<5% There is opportunity to be more ambitious in our approach to innovation: we have mainly investigated and adopted innovations that are already proven and getting results. Less than 5% of our innovations are at the far left of the spectrum, i.e. early stage solution development.



>40% We are focused on delivering a trusted and reliable service: with our continued emphasis on customer excellence it is not surprising to see that more than 40% of our innovation efforts are focused on delivering a reliable service to our customers. We should continue to pursue our customer innovations and consider how we can offer a broad experience to ready ourselves for CMex.



80% Asset Management is a key contributor to innovation. The majority of innovations (c.80%) are being considered in the 'Asset Management' and 'Customer Services & IT' directorates - some have crossover in multiple areas, such as Pontoon Works which increases our efficiency, and improves H&S at our works. Long-term trends highlight that industry is moving away from asset based solutions in favour of more data-led approaches. Whilst we have some examples of responding to this trend (e.g. network optimisation), we would like to see more like this in 2018.



>120 Brainwaves continues to be a valuable innovation platform: more than 120 ideas were submitted in 2017/18. Of these, almost half were awarded our "good idea" award. Around 10% of ideas submitted have been implemented (or are being implemented) into the business - this includes items such as the introduction of the St John's Ambulance First Aid phone app, and use of Biobullets to treat Zebra Mussels at our treatment works. There have been a further 11 ideas implemented in 2017/18 (from ideas submitted in previous years).