



Developing a 2050 Vision for the Water Sector: A Discussion Paper

March 2021





1	Why a 2050 Vision is needed	03
2	Challenges and opportunities facing the water sector	07
3	Our Vision	17
4	Sector strategic responses	19
5	Regulatory and policy principles for the future	31
6	Next steps	40

An aerial photograph of a coastal landscape. On the left, the sea meets a rocky coastline. A narrow road or path runs along the edge of a hillside. The hillside is covered in green grass and yellow wildflowers. To the right, there are large green fields divided by stone walls. A small settlement with several buildings is visible in the distance. The sky is blue with some light clouds.

1

Why a 2050 Vision is needed

Foreword

Over the next 30 years, the climate emergency will threaten every aspect of the water sector, increasing the risk of drought, flooding and biodiversity loss. Significant population growth, combined with the climate emergency, will place even more pressure on the environment, water resources, and the state of our pipes and equipment. At the same time, there is huge opportunity as the sector will be at the heart of delivering many of the outcomes in the government's ambitious 25 year plan to improve the environment, while meeting increasing consumer and community expectations, making a huge contribution to improved rivers and habitats. But all of this will need to be tackled while still ensuring that bills remain affordable.

We have always faced challenges, but these are bigger than anything before. To overcome them, we need the sector, government and regulators to build on current areas of joint work, and joint work and collaborate more effectively to accelerate the rate of positive change. The status quo and incremental approaches will not be enough. COVID-19 has demonstrated how quickly we can alter our ways of working and provides a good example of the accelerated change we need to deliver.

A 2050 Vision is needed to set out the long-term direction of travel for the water sector in England so that we and our stakeholders all know what we are aiming for, and what is needed to get there.

To rise to these challenges, the water sector will accelerate six strategic responses. To ensure that we get the best value for money from our sector responses, we also need policy and regulatory changes that are based on three key principles:

- **outcomes based**
- **focused on the long-term**
- **addressing difficult trade-offs**

These three principles are not new, but they are not always applied. We all need to work together to ensure they are achieved more consistently.

Without these changes, customer expectations will not always be met, the right investment will not always happen on time, and improvements will not be achieved in the most efficient way.

This Discussion Paper is a first step towards a Vision that we and our stakeholders can all stand behind. We are seeking views on our assumptions and early thinking. Success demands a more outward-looking sector, increasingly solving problems with partners, and we therefore invite all stakeholders to engage with us at this early stage.

We will use feedback on this paper to refine our ideas further, before publishing a final paper in the summer which will set out a long-term direction and support collaboration across the sector on the right pathway to 2050.



Christine McGourty,
CEO, Water UK

We have a clear purpose

Collectively as a sector, we serve over 55 million people and over 2.5 million businesses in England, supporting around 180,000 jobs across the whole supply chain for around £1 per customer per day.

We do more than provide affordable and efficient water and wastewater services. **Our purpose is to underpin public health, to protect and improve the environment, to unlock economic growth and to create wider social value for our customers, communities and society, today and in the future.**

The [Public Interest Commitments](#) that we made in 2019 are just one example of our commitment to this purpose:

- Achieve net zero carbon emissions for the sector by 2030, 20 years earlier than the government's target for England as a whole
- Triple the rate of leakage reduction across the sector by 2030
- Prevent the equivalent of 4 billion plastic bottles ending up as waste by 2030
- Be the first sector to achieve 100% commitment to the [Social Mobility Pledge](#)
- Make all bills affordable: We will ensure that for households where water and sewerage bills are more than 5% of disposable income, bills will be affordable by 2030, and we will develop a strategy to end water poverty

Outcomes we will deliver



Clean, reliable and resilient drinking water



Excellent customer experience



Affordable services accessible for all



Delivering value for the wider society and economy



Improving the environment



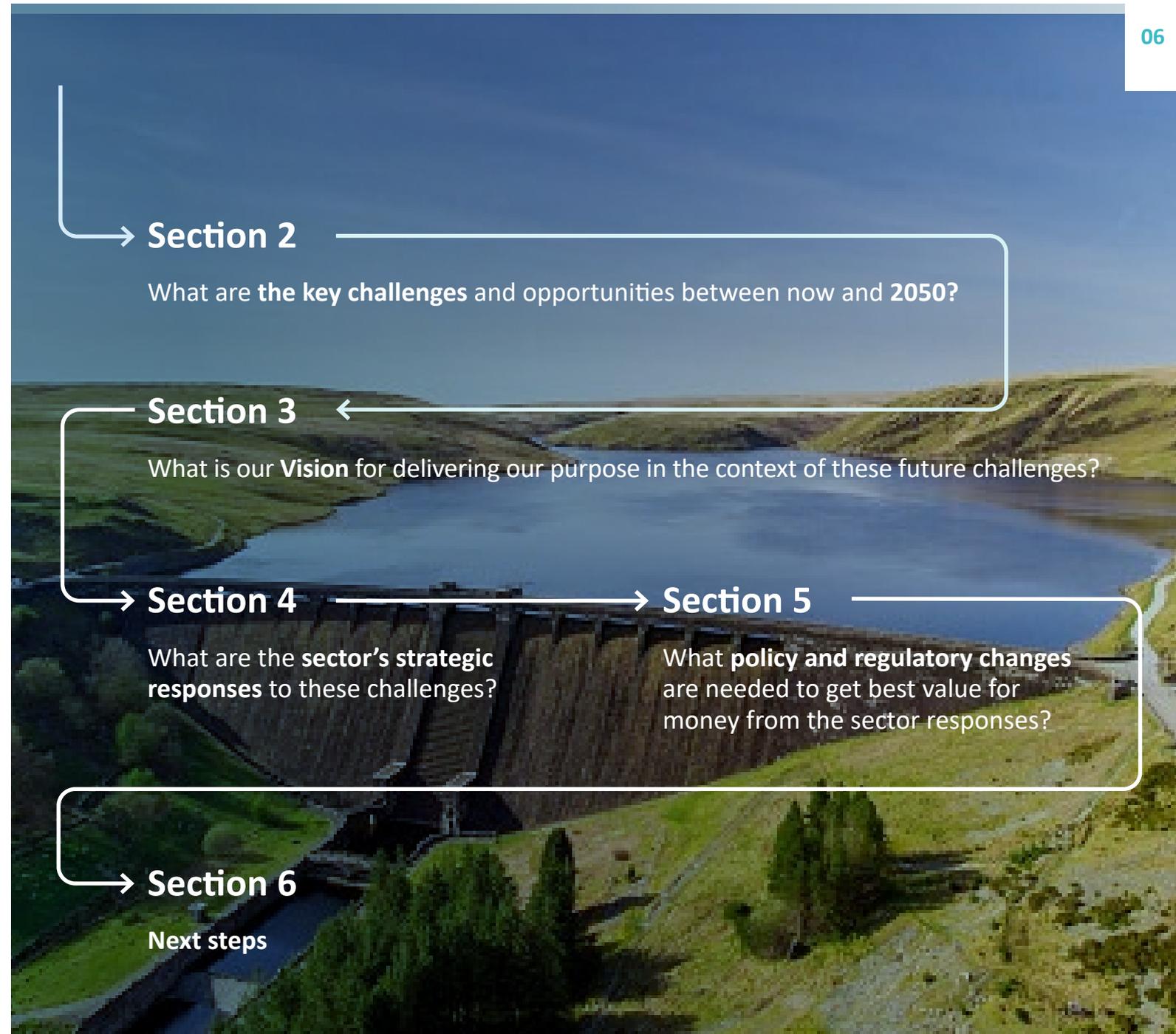
Reliable and resilient wastewater services

Overview of this Discussion Paper

In this Discussion Paper we highlight the key challenges facing the sector between now and 2050, and sketch the outline of our Vision for the future. The purpose is to focus on long-term strategic challenges rather than also dealing with all of today's issues.

We have identified **six strategic responses** from the sector to help meet these challenges. And we have identified **policy and regulatory** changes which will ensure that we get the best value for money and impact from our sector responses.

We will use this paper to elicit views and insights from others in order to publish a final Vision document this summer. We would like to use this time to further develop our thinking, including by getting into the specifics of possible solutions and priorities for joint work as we look towards the coming years.



→ Section 2

What are the **key challenges** and opportunities between now and 2050?

← Section 3

What is our **Vision** for delivering our purpose in the context of these future challenges?

→ Section 4

What are the **sector's strategic responses** to these challenges?

→ Section 5

What **policy and regulatory changes** are needed to get best value for money from the sector responses?

→ Section 6

Next steps



2

Challenges and opportunities facing the water sector

We face enormous challenges over the next 30 years

We have identified the key challenges to our purpose between now and 2050.

This is based on consultation with a wide variety of experts from every water company in England, and we would welcome the insights of others on this. Of these, the climate emergency stands out as the most profound and urgent risk.

Challenge 1:

The climate emergency means that we are faced with:

- Increased water scarcity, flood risk, extreme weather events, and reduced water quality
- Cutting carbon emissions to net zero this decade, and developing carbon-negative approaches

But the climate emergency also exacerbates the impact of population growth and the need for a better approach to protecting and maintaining assets.

Challenge 2:

Population growth

- Placing even more pressure on water resources, asset health and environment

Challenge 3:

Future-proofing asset health & skills

- Need to increase the health and resilience of our built and natural assets, and to future proof our skills and talent for new ways of working

Challenge 4:

Increased environmental standards underpinned by societal expectations

- Improving the environment already under pressure from the climate emergency and population growth
- Addressing the biodiversity emergency

Challenge 5:

Increased customer, community and societal demands

- Increased scrutiny on companies and higher customer experience and environmental expectations

Opportunities:

- Technology and innovation will continue to present exciting new opportunities. The pace of change is rapid and will result in step changes in productivity, enabling us to do more for less



We are facing unprecedented challenges – we need to adapt to meet customers' and communities' future expectations.

Challenge 1: Climate emergency

The climate emergency presents an extreme challenge to water and sewage treatment. We face increased drought risk between now and 2050.

Droughts are increasing in frequency, severity, and duration due to the climate emergency and population growth.

- Hotter, drier summers as a result of climate emergency are increasing the likelihood of a drought
- Total water supply is forecast to decrease by 7% by 2045 as a result of the climate emergency and limits to sustainable abstraction
- Between 2020 and 2050, we are twice as likely to have a year with water restrictions due to droughts in England when compared to the 1997-2004 time period. The South and East of the country are more exposed
- The chance of a serious drought between now and 2050 that results in water deficits and requires supply restrictions is between 1-in-7 and 1-in-4¹

Without action, the risk of not having enough water to satisfy our customers' demand is very real.

¹National Audit Office, Water supply and demand management, 2020

²National Infrastructure Commission, Preparing for a drier future: England's water infrastructure needs, 2018

³Committee on Climate Change, CCRA2: Updated projections of water availability for the UK, 2015



Up to 4,000 M/l day extra needed

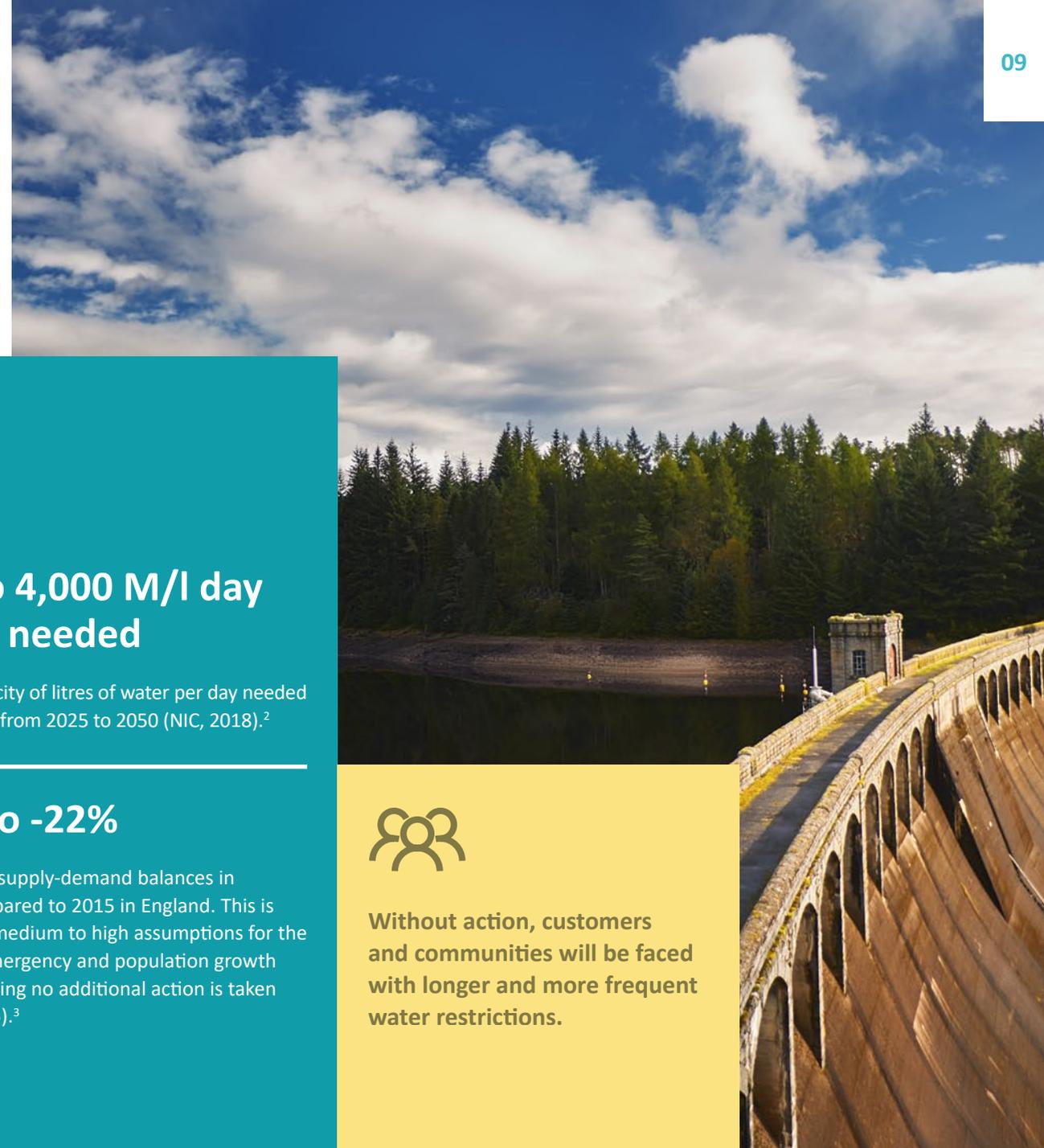
Extra capacity of litres of water per day needed in England from 2025 to 2050 (NIC, 2018).²

-8% to -22%

Change in supply-demand balances in 2050 compared to 2015 in England. This is based on medium to high assumptions for the climate emergency and population growth and assuming no additional action is taken (CCC, 2015).³



Without action, customers and communities will be faced with longer and more frequent water restrictions.



Challenge 1: Climate emergency

...we also face increased flood risk and extreme weather events.

In England, water companies are just one of the authorities with a role in reducing flood risk, alongside the Environment Agency, Internal Drainage Boards, and local authorities, so working in partnership will become even more important in the future.

Flood risk is increasing due to more intense winter rainfall and summer storms:

- Urban areas will experience more flash flooding in the future
- Expected annual damage due to floods are forecast to increase from £1.4bn in 2020 to between £1.7bn - £2.1bn by 2050
- On average, the more socially vulnerable are exposed to a greater flood risk

Increased flood risk has a big impact on our infrastructure:

- Increased incidence of sewer flooding, with increased pollution in the summer and increased overflow spills in the winter
- Reduced raw water quality and increased complexity of treating drinking water
- Impact on biodiversity: increased soil loss soil loss and movement of invasive non-native species
- Movement of chlorides from the coast into freshwaters

¹Committee on Climate Change, Third UK climate change Risk Assessment (CCRA3) Future flood risk, 2020



£300m - £700m p.a

Increase in expected annual damage due to floods by 2050 (CCC,2020). Water companies are just one of the authorities that have a role to play in reducing flood risk.¹



Without action, customers and communities will be faced with increased risk of sewer flooding and biodiversity loss.

Challenge 2: Population growth

The UK population is forecast to grow from 67m in 2020 to 75m – 79m in 2050, further increasing pressure on the supply and demand balance and our infrastructure.

Not only will demand be higher, the patterns of consumption will also be different:

- Growth is forecast to be highest in the South East of England, with projected growth between 19% – 25% by 2050. Average household size is also decreasing, resulting in many more connections to the network
- The population is ageing as well: In 2018, 18% of residents were 65+ years old, but this share will rise to 24% by 2043¹

This presents a number of challenges:

- The extra demand will place extra pressure on our water resources, asset health and the environment which will already be under pressure from the climate emergency. For instance, a larger population will result in an increase in the use of detergents which will result in higher levels of phosphorus entering rivers and lakes. This will be even more pronounced in the South East where the largest impacts will be felt
- With urbanisation, consumption patterns and concentrations will likely cause increasing differences in water usage by location
- Our relationships with customers will also need to adapt to cater for an ageing population

¹Committee on Climate Change, Updated projections of future water availability for the third UK climate change Risk Assessment, 2020

²Office for National Statistics, National population projections, 2018



Without action customers and communities will be faced with longer and more frequent water restrictions, poorer network performance and biodiversity loss.

+13% to +18%

Increase in overall UK population from 2020 to 2050 (CCC, 2020)

+18% to +24%

Increase in South East population from 2020 to 2050 (CCC, 2020)

2.7

Average household size in the UK by 2040, down from 2.85 today²



Challenge 3: Asset health & skills

The climate emergency and population growth increase pressure on our asset health, so we need to future-proof our assets.

- The challenge is to recognise that the approach to maintaining and replacing assets over the past 30 years does not meet future challenges, particularly in the context of the climate emergency
- Many of our water mains and sewers were first built in the 19th century. It has been estimated that only 0.2% of sewers and 0.6% of water mains are replaced annually. At this rate, it would take 500 years to renew our sewers and 167 years to renew our water mains¹
- We can and do find innovative ways of achieving higher levels of performance from our assets. But this can only go so far, and ultimately, we need to find a new way of measuring, protecting, and investing in our natural and built assets. If this is not done, by 2050 service will deteriorate significantly, including:
 - the number of water main bursts will increase by 20%
 - the number of interruptions to water supplies will increase by 25%
 - sewer blockages and collapses, and the resulting flooding and pollution, will increase by 6%
 - but customer expectations and regulatory targets on the level of service are increasing
- It has been projected that renewal rates of built assets should increase to 1.2-1.3% for performance to stand still. We also need to consider natural assets, which may degrade over time. Investment, smarter networks, and other approaches are all likely to be needed but we lack a consistent framework for evaluating them



Without action customers and communities will be faced increased risk of supply interruptions, mains bursts and flooding.



Future proofing our skills and talent

We are faced with three challenges:

- Our workforce is ageing, so we need to continue to attract the best minds to the sector and transfer our know-how and experience to the next generation
- We will need a different skill mix going forward to respond to future challenges, for example, we need to attract new skills which will become increasingly important in the future challenges. For example, machine learning and big data
- We need our workforce to be more diverse and inclusive so it represents the population that we serve

25%

Increase in supply interruptions if asset replacement rates are not increased (UKWIR, 2017)

350,000km

Km of water mains in the UK that will begin to fail more often (UKWIR, 2017)

625,000km

Km of sewers in the UK that will begin to fail more often (UKWIR, 2017)

Challenge 4: Improving the environment

We need to deliver substantial improvements to our natural assets, which will already be under significant pressures from the climate emergency and population growth.

- The Government’s 25-year plan provides a clear direction of travel for environmental improvements. Its ambition is to help achieve “the first generation to leave our environment in a better state than we found it” and to “help the natural world regain and retain good health” (Defra, 2018)¹
- This includes:
 - Moving from 15% to 75% of rivers close to their natural state
 - Restoring 75% of the UK’s one million hectares of terrestrial and freshwater protected sites to a favourable condition, securing their wildlife value for the long term
 - Increasing woodland in England in line with Defra’s aspiration of 12% cover by 2060
 - This means that investment in natural assets is just as important as investment in physical assets
- Like reducing flood risk, we have a big role to play in helping to achieve these ambitions, but we are only responsible for around one-third of water quality issues in rivers, which means other authorities and sectors also need to play their part
- This challenge is made even harder due to the extra pressure on the environment brought about by the climate emergency and population growth

¹Defra, A Green Future: Our 25 Year Plan to Improve the Environment, 2018

²International Water Association, Water Utility Pathways in a Circular Economy, 2016



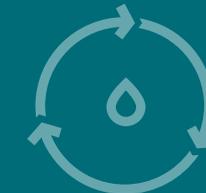
Government’s 25-year goal of clean and plentiful water (2020)

Improving at least three quarters of our waters to be close to their natural state by...

- Minimising leakage
- Reaching or exceeding objectives for bodies of water
- Reducing demand
- Improving cleanliness of waters / reducing pollution
- Reducing damaging abstraction



Without action customers and communities will be missing out on the benefits of having an improved environment.



Understanding the circular economy is key to improving the environment

As a recycled resource, the water sector’s contribution to the circular economy can be significant. Reduced leakage, increased reuse and lower energy consumption can help close the loop between catchments and consumers (IWA, 2016).²

Challenge 5: Consumer and community expectations

In addition to the other challenges, we need to meet increasing consumer, community and societal expectations.

Consumer expectations are rising and priorities are changing, driven by advances in technology, standards and societal change:

- **Transparency and ethical standards:** Gen Z (born between 1995 – 2010) are set to become the largest group of consumers globally in 2020. They want brands to be transparent, to know what is in their food, what country their clothes were made in, how employees are treated, and what company profits are being put towards.
- **Environment:** Consumers are increasingly holding companies to account on their environmental performance, including their carbon footprint, use of electric vehicles, air travel, and single-use plastics.
- **Technological integration, ease and convenience:** Consumers expect seamless processes and intuitive interactions, and the rise in real-time information means they are becoming less willing to wait.
- **Technological uncertainty:** In recent years, we have seen how tablets, smart phones, social media and chatbots have transformed how companies engage

with customers. Over the next 30 years, we will see significant technological advancements, including 5G (and subsequent generations), the Internet of Things, Virtual Reality, Augmented Reality, and 3D printers. While all of these have huge potential, there is great uncertainty about which technologies will take off, be most relevant for service delivery and the environment, and how customers of the future will expect to be served.

- **Public perception of privately run essential services:** Linked to consumer expectations on transparency and ethical standards, there is a general debate on private ownership of essential services and, post-Grenfell, the efficacy and priorities of independent regulation that covers a range of sectors, such as rail, post, water, public transport, and prisons.



Without action customers and communities will become less and less satisfied with their water company.



Consumers of the future



More connected



More ethical



More aware



Less patient

Innovation will play a key role in helping us meet the challenges

We have the opportunity to transform our ways of working:

- We have a long history of innovation, stretching back over 400 years, from the world's first city-level water transfer project in 1613 to the invention of the activated sludge process in 1914
- We are proud of the ingenuity of those that came before, and will continue to innovate to deliver for our customers and the environment, as set out in our [2050 Water Innovation Strategy](#)¹
- The key to this will be to promote collaboration with others, both within the water sector and beyond, and to foster a culture where innovation thrives. Given that the climate emergency is impacting virtually every sector, there is a new receptiveness and urgency for collaboration and alliances

There are many opportunities for us to improve:

- Opening data and using new technologies, approaches and ways of working
- Improve sector-wide collaboration and co-ordination
- Work more closely with universities so that academic research can help us meet our challenges
- Increase the speed of innovation from ideation to implementation
- Create a streamlined and effective point of access to water sector innovation for external partners nationally and globally
- Develop regulatory frameworks to enable innovation
- Create a culture where people are willing to take risks to innovate
- Turn ideas into commercial products
- Learning from others within and outside the sector

¹Water UK, UK 2050 Water Innovation Strategy, 2020



The Centre of Excellence

- A key part of the 2050 Water Innovation Strategy is the Centre of Excellence, a virtually integrated innovation centre which serves as a vehicle for delivering innovation
- The water industry regularly undertakes innovation activities such as workshops, hackathons, incubators and research centres. However, small-scale innovations from these activities do not always diffuse across the industry, meaning we potentially lose out on scalable innovations that can help improve efficiency
- To address this, the Centre of Excellence will serve as a focal point for water innovation and help enable delivery and implementation of innovation across the industry. The Centre will help foster transparency, collaboration and skill sharing



Big data, AI, machine learning and digital twins

- We have vast amounts of data, covering everything from the real-time condition of underground assets to customer sentiment on social media posts
- With advancements in big data, artificial intelligence (AI), and machine learning, we will be able to unlock valuable insights from this data to help optimise operations and investment, and manage risk. Imagine being able to predict the next mains burst



The last 30 years show that we have strong record of rising to challenges

It's a good time to reflect on the progress that we have made as a sector over the last 30 years, which highlights how we can rise to meet our challenges.¹

It's easy to forget how things were in the water sector in England and Wales in the years before privatisation in 1989:

- Beaches were routinely spoiled by sewage and wildlife was declining in polluted rivers
- The water infrastructure was crumbling from underinvestment and pipes were increasingly leaking
- The then Environment Secretary described the River Mersey as "an affront to the standards a civilised society should demand of its environment"
- All of this gave Britain the unwanted nickname of "the dirty man of Europe"

We've come a long way since then, investing around £160 billion to improve the service to our customers. In addition, we have managed to keep bills low for our customers. We have done all of this while continuing to contribute to our local communities and environment:

- We have improved the status of Sites of Special Scientific Interest (owned by the sector) with 91% in target condition in 2016, compared to 75% in 1996
- We have supported species abundance and diversity – otters are now recorded in 59% of surveyed sites, compared to 23% in 1990
- Our greenhouse gas emissions were 43% lower in 2016 compared to 1990
- There are now even salmon and otters in the River Mersey

Particularly in light of ever-increasing expectations from society, there is still much more to do. So we will keep improving in the years to come - and, where issues emerge - we will be open about how we are fixing them.

¹Water UK, 30 Years of Progress: Cleaner, Safer, Better Water, 2019





3

Our Vision

Together we need to build a shared endeavour to rise to the challenges of the future

The water sector has always faced challenges, but the challenges between now and 2050 are bigger than anything before.

To rise to these, water companies, the supply chain, government, regulators, customers, and communities must all come together to accelerate the rate of positive change to achieve our Vision.

We will achieve our Vision while becoming ever-better at fulfilling our purpose of underpinning public health, protecting and improving the environment, unlocking economic growth and creating wider social value for our customers, communities and society, today and in the future.





4

Sector strategic responses

We will accelerate six sector strategic responses to deliver the Vision

To deliver the Vision, we need to work together with government, regulators, customers, communities and other stakeholders in a collaborative new way, rather than working in silos.

We have identified a set of water company strategic responses that describe, at a high level, the actions we think we need to take. As we develop our final Vision, we would welcome views not just on whether these themes are right, but also on how we might know they have been achieved in practice.

We are already on the path of implementing some of our strategic responses as we are already dealing with the impacts of the climate emergency – to achieve the 2050 vision we need to *accelerate* the level of change.

We will continue to look outside of the sector to find best practice approaches that will further improve our own performance levels.

COVID-19 has demonstrated how quickly we can adapt our ways of working, and provides a good example of the accelerated change we need to deliver.

Today  2050

- 1 Demonstrate leadership and act as a role model for positive change
- 2 Drive efficiency and value through a step change in innovation
- 3 Put partnerships at the heart of delivering outcomes
- 4 Transform our relationships with customers and communities to jointly deliver outcomes
- 5 Deliver investment where and when it is needed based on robust long-term plans
- 6 Use market mechanisms and incentives where they can deliver environmental and social objectives



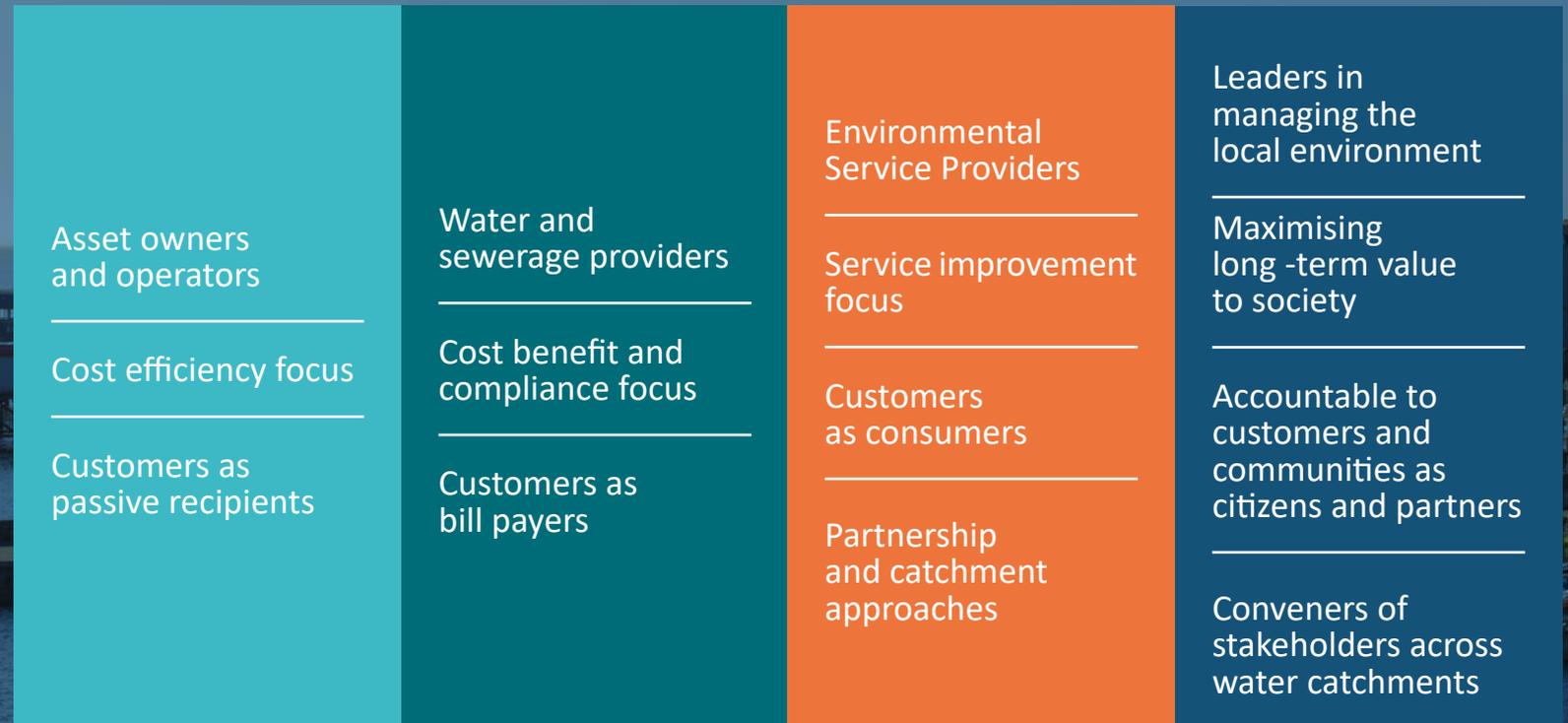
We will transform our role in society

The role of the water company has changed significantly over the past 30 years.

Customers used to be viewed as passive recipients of water and wastewater services, and companies used to focus narrowly on their own assets. Now, we are proud protectors of the environment, with a responsibility much wider than just our own assets. We work in collaboration with an increasing number of partners, and customers and communities are active participants in the sector. We have improved faster in some areas than others, but looking forward, in achieving our Vision, we will challenge ourselves to ensure that we are adding maximum value for society across all parts of our business.

To achieve our Vision, we need to continue to transform our role in society

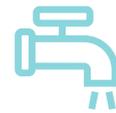
Looking Forward →



← Looking Back

Looking back from 2050 what would we see?

Our strategic responses describe the actions we will accelerate to deliver the Vision. By implementing these responses between now and 2050, we will continue to transform and broaden our role in society.



Our sector strategic responses describe the actions we will accelerate to deliver the Vision

Demonstrating leadership and a role model for positive change

Driving efficiency and value through a step change in innovation

Putting partnerships at the heart of delivering outcomes

Transforming our relationships with customers and communities to jointly deliver outcomes

Delivering investment where and when it is needed based on robust long-term plans

Using market mechanisms and incentives where they can deliver environmental and social objectives



Looking back from 2050 what would we see?

The water sector as a clear driving force for positive societal change and a role model for others to follow

The sector has transformed the way it provides services to its customers, 24/7, by boldly embracing innovation and using the latest technologies, approaches and ways of working

The sector is outward-focussed and a trusted and dynamic delivery partner

Customers and communities feel linked to their local water environment and empowered to positively influence their service providers

The water sector has made the right investments at the right time, consistent with a long-term direction that has wide support, so society's expectations are met despite the challenges of the climate emergency

A sector that promotes changes in the delivery framework where this can generate greater value to society and the environment



How customers and communities benefit

These responses will enable us to deliver our purpose:

- To underpin public health
- To protect and improve the environment
- To unlock economic growth and to create wider social value for our customers, communities and society, today and in the future

Demonstrate leadership and act as a role model for positive change

Looking back from 2050, what would we see?

The water sector as a clear driving force for positive societal change and a role model for others to follow.

Water companies are in a privileged position:

- We can confidently plan and invest for the **very long-term**
- We have a **geographic and economic reach** that enables us to lead wider change in our communities

The sector will therefore be a positive role model for others:

- Taking the lead in achieving long-term societal goals, always acting responsibly, and recognising public interest in our purpose.
- Working with our supply chains to support these wider goals
- Bringing regional interests together, acting as a keystone investor in shared endeavours where those interests overlap
- Demonstrating leadership in promoting a more diverse and inclusive workforce

The Public Interest Commitments provide an example of positive leadership



What does this mean for the environment...

- Achieving net negative operational carbon emissions for the sector by 2030
- Taking a circular economy approach to our operations and aspiring to achieve zero waste from all of our activities
- Leading on the preservation and enhancement of natural capital in our catchments and landholdings



...for resilience and for customers and communities?

We will build more resilient communities by:

- Ending water poverty (supported by an appropriate policy framework)
- Developing the skills of our potential future workforce in partnership with schools, colleges and universities
- Acting to promote diversity within our workforce as a role model for others

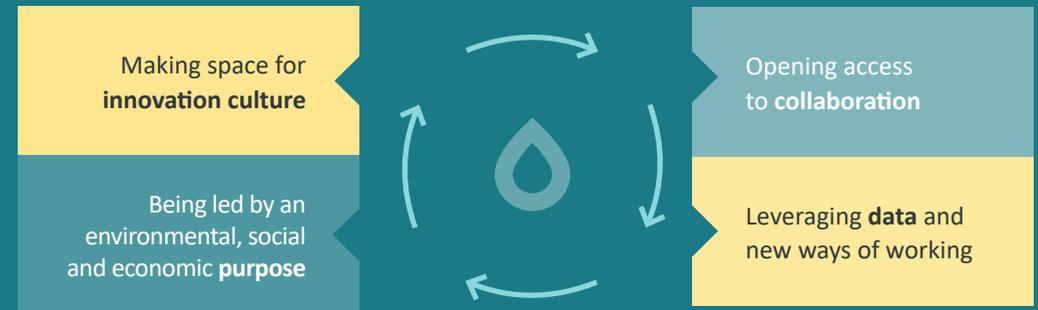
Drive efficiency through innovation by challenging how we work and embracing new ideas

Looking back from 2050, what would we see?

The water sector has transformed the way it provides services by harnessing innovation and using the latest technologies, approaches and ways of working.

More of the same will not achieve all that we need to do

Innovation is about harnessing and exploiting good ideas, big or small, to make us better at what we do. The sector will drive greater efficiency and value through innovation. Harnessing the opportunities and learning from **big data**, **AI**, **machine learning**, and **behavioural sciences** will be essential. Our vision is to deliver transformational change through innovation that delivers greater value for customers and the environment. A water sector **Innovation Centre of Excellence** is now virtually connecting, integrating and enhancing existing innovation activity and facilities across the sector.



What does this mean for the environment...

- Implementing the best new ideas from other countries – especially in response to the climate emergency – to protect and improve our environment



...for customers and communities...

- More personalised communications through Big Data, AI and behaviour science
- Instantaneous information



... and for resilience?

- Using big data and machine learning to identify the assets most exposed to risk and investing in them as a priority

Put partnerships at the heart of delivering outcomes

Looking back from 2050, what would we see?

The sector is outwardly focused and a trusted and dynamic delivery partner.

Increasing the resilience of the environment and communities that we serve requires more collaboration across different sectors to deliver in an affordable way

- Water companies will act to deepen existing delivery partnerships and develop new ones.
- Delivery partnerships will be extended to landowners, farmers, local authorities, developers, flood authorities, retailers, environmental and consumer NGOs, and other infrastructure providers.



What does this mean for the environment...

- New opportunities identified to deliver multiple outcomes with environmental benefits that add to and reinforce each other, ranging from flood alleviation to soil health
- Better targeting and collaboration with those causing pollution - for example, wet-wipe manufacturers or farmers - enable faster results for water quality and habitats



...for customers and communities...

- Reduced costs of delivery for some outcomes
- Better targeting of assistance to customers
- Closer relationships with local partners



...and for resilience

- Catchment-wide solutions will improve the resilience of services to extreme events

Transform our relationships with customers and communities to jointly deliver outcomes

Looking back from 2050, what would we see?

Customers & communities feel linked to their local water environment and empowered to positively influence their service providers.



What does this mean for the environment...

- Customers and communities who are both willing and able to assist in achieving environmental goals, such as reduced water use, and the elimination of escapes from the sewer



...and resilience?

- Harnessing the power of thousands of small changes in behaviour across our regions to improve the resilience of services and of the environment

Deeper relationships can enable a more responsive sector and faster progress towards outcome delivery

Forging authentic relationships with local communities, and the customers of today and tomorrow, will encourage wider participation in the protection of the water environment.

By working with customers who value the natural catchments around them, and demonstrating how this aligns with the services and infrastructure we provide and look after, we can deliver better on the outcomes they told us are important to them.

Companies will develop new opportunities for customers and communities to participate in shaping and delivering priorities.



...for customers and communities

- Communities will have opportunities to shape the outcomes that affect them and the methods we use. Models could include citizens assemblies / juries, catchment partnerships
- Open data will provide customers access to data on services provided to them and greater understanding of their usage, while predictive analytics will allow service providers to respond more efficiently

Deliver investment where and when it is needed based on robust long-term plans

Looking back from 2050, what would we see?

The water sector has made the right investments at the right time based on robust long-term plans, so society's expectations are met despite the challenges of the climate emergency (provided appropriate policy and regulatory frameworks are in place).

The sector has key investment needs

The sector will need to invest to:

- Improve in the face of the climate emergency
- Meet the growing aspirations of customers and wider society
- Meet new environmental standards and improve water quality
- Invest to retain the health of its assets that are often out of sight and out of mind until things go wrong

Replacing existing assets is crucial for us to achieve net zero. This has been recognised by the Water Industry Commission for Scotland, which has commented that, "Asset replacement is becoming an increasingly important consideration, especially if Scottish Water is to achieve net zero emissions".

Given the high costs the sector will ensure that transparency in the way that it plans and invests so that the need, efficiency and efficacy of the investments are clear, through:

Place-based planning approaches which link-up and integrate with plans from other sectors as well as engage local stakeholders as active participants in long-term planning and implementation

Resilience planning approaches, which result in a common understanding of risks and interdependencies, is grounded in customer/ community views, and which chooses the optimal investment in resistance, redundancy, reliability, response, and recovery

Using technology to plan optimally, for instance by developing digital twins to fully understand the impacts of network events and asset failures on service

Integrated long-term plans that demonstrate the key trade-offs and propose innovative solutions to delivering a resilient and affordable future. This can help show how individual schemes fit in, and help to understand their contribution to the bigger picture

Use market mechanisms and incentives where they can deliver environmental and social objectives

Looking back from 2050, what would we see?

A sector that promotes changes in the delivery framework where this can generate greater value to society and the environment.

Solutions to our challenges cut across many sectors, while water companies' resources are constrained.

Market mechanisms

Well-designed and targeted **market mechanisms** can play a key role in achieving our aims by:

- Revealing the most efficient ways to deliver outcomes
- Attracting new actors and new ideas
- Incentivising innovation
- Breaking down barriers between different sectors of the economy

Incentives and signals

Improved use of **incentives, price signals and behavioural insights** can play a key role by:

- Enabling good decisions in support of growth and new development across all regions
- Promoting efficiency and avoiding harm in the use of water resources, wastewater and drainage
- Boosting affordability at an individual bill level.



The water sector will:

- Apply market approaches and incentives where these can best meet its own obligations
- Identify opportunities for market mechanisms to play a wider cross-sectoral role and where this may unlock other funding sources
- Improve the economic and behavioural signals it gives others for use of water resources and wastewater services



There are areas where transparent collaboration between parties can best identify the strategic investments that are required to meet multiple objectives. We will promote the approaches which best serve the interests of customers.

We will learn from best practice: Investing for the long-term

MOSE, Venice, Italy



Demonstrate leadership and a role model for positive change



Drive efficiency and value through a step change in innovation



Deliver investment where and when it is needed

“The MOSE is a model of adaptation to climate change and a worldwide reference for other countries involved in the challenge of coastal and environmental defence.

“In this way, Venice has adopted a solution that takes advantage of the sea through an innovative technology. The knowledge and information acquired must be shared with the global community.”

Consorzio Venezia Nuova

This case study highlights that large infrastructure projects can take as long as 30 years to start delivering benefits, but these investments might still provide the best value for money for customers and communities in the longer term.

We need to take a long-term approach, especially in the context of the climate emergency.

- MOSE is a system of mobile gates to protect the city of Venice and its inhabitants from the **increasing risk of flooding due to the climate emergency**
- Venice is exposed to a significant risk of flooding, and with the climate emergency, the risk is increasing. 12 of the last 20 major flooding events in Venice since 1935 have all happened in the 21st century
- MOSE took over 30 years to build and was subject to delays and controversies, but now the system is delivering **substantial benefits**: mitigating flood-risk, restoration of biodiversity, reinforcing coastal zones, and improving water quality
- It is **an example of the benefits and value that long-term planning and investment can bring to the community**
A long-term approach is needed to tackle the challenges that we face

We will learn from best practice: How technology and working together in partnership can lead to positive change

“One of the most comprehensive, federated digital twins currently in operation, expertly demonstrating the concrete life improvements that smart water can provide.

“The programme has also highlighted the value of effective wastewater infrastructure, prompting widespread public support for a rate increase to fund a NZ\$400 million investment to improve water quality in the region.”

Global Water Intelligence

Safeswim, Auckland, New Zealand



Put partnership at the heart of delivering outcomes



Transform our relationships with customers and communities to jointly deliver outcomes



Use market mechanisms and incentives where they can deliver environmental and social benefits

This case study highlights how being creative and working in partnership with others can add real value to customers and communities and broaden the role of the water company in society.

- Safeswim is a water quality program that provides **real-time science-based** advice to Auckland’s beach users on the level of risk associated with swimming at specific locations
- The program is a **joint initiative** between Watercare (Auckland’s water utility), Auckland Council, Surf Lifesaving Northern Region, and Auckland Regional Public Health Service, and uses advanced technology
- Safeswim won the **smart water project of 2020**, and is an example of **how technology and partnership can lead to environmental and social benefits**

A man in a light blue sweater and jeans carries a young boy on his shoulders. They are walking on a sandy beach with waves in the background. The man is smiling and looking towards the child. The background shows a rugged coastline with cliffs.

5

Regulatory and policy change for the future

To get the best value for money from our sector responses, we need to work together on policy and regulatory changes

Our six sector strategic responses will help us meet the challenges of the future. Policy and regulatory changes can help us get the most out of those responses. The direction of travel is not new, but we need to embed the principles, ensuring they help guide decisions on policy and regulation.

Our six sector strategic responses

- Demonstrating leadership and acting as a role model for positive change
- Driving efficiency and value through a step-change in innovation
- Putting partnerships at the heart of delivering outcomes
- Transforming our relationships with customers and communities to jointly deliver outcomes
- Delivering investment where and when it is needed based on robust long-term plans
- Using market mechanisms and incentives where they can deliver environmental and social objectives

Three regulatory and policy framework principles

Our strategic sector responses will help us deliver the Vision. But to get the best value and impact from our responses, we need policy and regulation to meet three principles:

- Outcome based
- Focused on the long-term
- Addressing difficult trade-offs

These principles are not new, but they are currently applied inconsistently. We all need to work together on accelerating their application

How regulatory and policy changes will increase value for money from our sector responses

- To ensure we can focus our leadership on delivering outcomes (not outputs) that provide value in the long-term and are aligned with society's overarching goals
- Innovation will deliver the highest value when aimed at outcomes. Pay-offs can take time to materialise so we need to focus long-term
- Effective partnerships provide the most value when aimed at delivering outcomes, but take time to set up. We need regulatory frameworks to focus on the longer term
- Clear guidance from overarching policy will help us transform our relationship with customers as we are working towards joint goals
- We will develop better long-term plans to guide investment decisions. But we will be faced with difficult trade-offs that need to be assessed in the context of clear overarching policy and reflecting a long-term approach.
- Clear guidance on overarching policy goals and focusing on outcomes and value over the long-term will ensure that market mechanisms are used in the most appropriate way



This will let us deliver real impact with efficiency and affordability

There is consensus on the direction of travel...

We are not alone in calling for these policy and regulatory changes. The Prime Minister, government, Environment Agency, Ofwat, and the National Infrastructure Commission (NIC), have all recognised the need for changes to the current approach. This degree of consensus suggests the sector should look to collaborate quickly with stakeholders on the most powerful potential improvements.

We have identified three regulatory and policy framework principles for the future:

- Outcome based
- Focused on the long-term
- Addressing difficult trade-offs

...these are aligned with the broad direction of travel that policy-makers and regulators have identified, but we need policy and regulation to evolve in line with the principles at a faster pace so we can meet future challenges

“Good regulation is not about a process - what some call red tape - but an outcome: a greener world. So all good regulation must be outcome focused, stipulating what needs to be achieved rather than focusing only on the means to achieve it.”

[Sir James Bevan, January 2021](#)

This has also been recognised in Ofwat’s 2019 strategy ‘Time to act, together’ strategy:

“We need to act now to guarantee the future. [Our] strategy explains how we will drive progress in the water sector both now and over the longer term. It evolves and improves our existing approach, to make sure we are focused on sustaining progress over decades to come, not just for the next five years.”

[Rachel Fletcher, October 2019](#)

“Tackling environmental challenges requires a long-term approach and political commitment to that journey – even when the political cycle can be short term.”

[George Eustice, Secretary of State for Environment, Food and Rural Affairs, July 2020](#)

The NIC has estimated that, “relying on emergency [drought resilience] measures would cost an estimated £40 billion over the next 30 years – being resilient would cost only £21 billion.”¹

[The National Infrastructure Commission, July 2018](#)

The recent [Dasgupta Review](#) on the economics of biodiversity,

“calls for urgent and transformative change in how we think, act and measure economic success to protect and enhance our prosperity and the natural world”. The Prime Minister highlighted that, “protecting and enhancing nature needs more than good intentions – it requires concerted, co-ordinated action.”

...but we need to increase the pace of change

There are already many good examples of policy and regulation that are outcomes based, focused on the long-term and thoughtful about trade-offs between different objectives. These are having a positive impact, but there are other areas that we need to address.

Examples of current approaches which could be built on

- Government’s net zero policy goal
- Aspects of Ofwat’s outcome delivery incentives
- Work underway with initiatives on RAPID and on WINEP reform
- Defra’s 25 year Environment Plan targets will have a long-term focus
- RCV provides a long-term commitment
- Increasing use of catchment-based approaches
- Water efficiency labelling on electrical appliances

RAPID -Regulators’ Alliance for Progressing Infrastructure Development

WINEP = Water Industry National Environment Programme

Policy framework principles for the future:

- Outcomes based
- Focused on the long-term
- Addressing difficult trade-offs

Examples of where we need to go faster and further

- Translating Defra’s 25-year Environment Plan into outcomes-based targets instead of output-based targets
- Policy that focuses on integrated, local long-term environment planning instead of disjointed plans on different timescales
- Economic regulation that provides incentives that better match society’s long-term goals
- Economic regulation that encourages innovative solutions for environmental net-gain
- Overarching policy that includes:
 - Long-term policy direction, e.g., resilience standards, national policy for affordability, clear statement on alternative funding options (e.g., ELMS) for environmental improvements to protect affordability
 - Clear guidance on the difficult trade-offs, e.g., affordability vs resilience investment
 - A more complete understanding of sector interdependencies, e.g., the relationship between water efficiency and building standards, new building developments and water quality or the shift to hydrogen energy and its impact on water scarcity

We need to work together to make it happen

Why we need to work together:

- Achieving the best outcomes for customers and society will require aligned decisions from a wide range of stakeholders
- The challenges we are faced with are multi-faceted and require expertise from a wide range of disciplines and perspectives
- There is no single organisation that holds all the data and information to make the best decisions
- We need trust to experiment and test new approaches and ideas without fear of failure

As part of our consultation, we will explore how stakeholders, including the supply chain, government, regulators and NGOs, can best work together to achieve the Vision.



What would the world look like in 2050 for customers and communities?

Without faster policy and regulatory change driven by all of us, customers will be faced with lower service and higher bills in the future



Without sector strategic responses and policy and regulatory changes:

- Continuation of business-as-usual ultimately means substantially increasing the risk of:
 - More frequent and longer water restrictions
 - Constraining economic growth (e.g., new developments).
 - Failure to meet aspirations of the 25-year environment plan
 - Less affordable bills in the long-term
- Pace of change in the sector does not keep up with the climate emergency and other external challenges – this means **customer expectations will not be met**



With sector strategic responses but **without** policy and regulatory changes:

- **Customers' expectations will not always be met** as continuation of existing policy and regulatory framework lack focus on the long-term
- This leads to **sub-optimal investment and inefficiency**
- **Lower service and higher bills** (lower affordability) in **the long-term** as a result of, for example:
 - Resilience investment not always approved in a timely way
 - Environmental improvements not achieved in most efficient way



With sector strategic responses and key policy and regulatory changes:

- Optimal alignment of sector pace of change and policy and regulatory framework means that **customers' expectations will be met at the most efficient cost**
- Society and customers benefit from long-term focus in policy and regulation as it enables:
 - Timely and efficient investment in resilience in support of economic growth and affordability
 - Environmental improvements achieved in most cost-effective way

Outcomes based regulation

Regulation has a significant impact on how water companies operate. Outcomes-based regulation focuses our efforts on ensuring that we give customers and communities what they want.

Why do we need this?

So we can deliver more benefit (e.g., environmental gain) per pound of investment and promote innovation

Examples of where the current approach is not future-proof:

- Ofwat's Outcome Delivery Incentive framework does not always focus on outcomes, and in some areas still focuses on outputs
- Environmental regulation that is output focused and targets "built solution" instead of overall outcome, - not catchment/systems - but specific programmes for the water sector
- Incentives are skewed towards solutions with low up front costs and skewed against nature-based solutions (NBS) – which are riskier and have a different cost profile
- Not reflecting all environmental consequences – (e.g., build something that has a higher carbon footprint, but is sure to deliver reduction in phosphorus and nitrates).
- Continuation of the current approach means environmental improvements will cost society more and will be less effective
- The Environment Bill provides an appropriate framework to move to an outcomes/systems-based approach. The government has discussed using it to set output-based targets that have perverse incentives

Key changes that will support us meeting future challenges:

- **Outcomes based** so all stakeholders are incentivised to deliver society's expectations and innovation is focused on outcomes not outputs
- Promoting **integrated local place-based planning**.
- Ensuring that **nature-based solutions are incentivised appropriately** with appropriate recognition of cost profiles, wider amenity, and public health benefits
- **Increased focus on catchments and systems**, so that water companies can contribute to improving their wider environment
- Emphasis on solutions that promote **biodiversity net gain** (e.g., new projects must result in a minimum X% net gain).
- A **broader approach to funding** that focuses on the right outcomes for society (e.g., 'polluter pays' solutions alongside taxpayer or customer funded payments)
- A clearer, agreed, more sophisticated approach to taking risks - including where the payoffs are less certain but potentially larger
- **Reflect all environmental consequences and interdependencies**

Focused on the long-term

Planning over a longer period can result in lower bills, better intergenerational fairness, and more impactful solutions for customers and communities in the longer-term. This is especially important in the context of the climate emergency.

Why do we need this?

So we can deliver our vision and optimise affordability in the short and long-term

Examples of where the current approach is not future-proof:

- **Current approach encourages focus on solutions that have a high degree of certainty about medium-term results** – new and innovative solutions are not only less certain they may take longer to provide pay-offs
- **Lack of collaborative approach to developing evidence base for resilience investment means that investment depends on short-term data availability** (and assumes that the lowest levels of historical investment represent the most appropriate values for the future)
- Continuation of the current approach risks customers paying more in the long-term and not meeting society's expectations as we focus on short-term decisions
- RAPID provides a positive step in the right direction but is only focused on one area of resilience

Examples of key changes that will support us meeting future challenges:

- **Encouraging integrated long-term planning and enabling the right level of efficient investment** – assessed in the long-term context and covering the climate emergency, environment, long-term asset health, resilience, drinking water quality
- **Provide better long-term incentives** – intergenerational fairness needs to have greater weight in the price control
- **Include appropriate risk sharing, particularly for long-term solutions**
- **Enable innovative solutions not just on environmental schemes, but potentially taking different approaches in other areas too** – making sure that learning from failure is part of a successful innovative culture
- This needs to be supported by:
 - Coherent, predictable and proportionate regulation across the value chain
 - Framework for market mechanisms consistent with environmental and social objectives

Addressing difficult trade-offs

Our ambition is to deliver the Vision in an affordable and efficient way. We recognise there will be trade-offs, so therefore we need to work with all stakeholders to agree a clear and overarching policy direction.

¹ National Infrastructure Commission
National Infrastructure Assessment

Why do we need this?

So that different policy directions and regulation are working towards the same outcomes

Examples of where the current approach is not future-proof:

- The current approach to Strategic Policy Statements is focused on high level objectives, but it does not provide clear guidance on key trade-offs, such as:
 - What level of resilience are we aiming for?
 - How do we balance affordability against investment in resilient services?
- The current approach leaves key trade-offs to Ofwat and the companies to decide in the context of the next price control, meaning we face a disconnect between the long-term expectations of citizens and the short-term views of water customers

Citizens expect decisive action on the climate emergency while customers think about the 'here and now' instead of focusing on intergenerational fairness

This distinction between customers and citizens risks water companies failing society's long-term expectations as a result of focusing on short-term bill movements

- Some government policies may have unintended consequences that only come to light years later – e.g., the drive to make new homes 'airtight' subsequently lead to indoor air quality issues. Policymaking should consider wider impacts and how each political objective and initiative stacks against others

Examples of key changes that will support us meeting future challenges:

- **Policy direction that makes key trade-offs.** Long-term policy direction needs to recognise that these goals can sometimes act against each other. One obvious tension is that a reluctance to invest at the right time may result in higher bills in the future. For example, the NIC has found that, "Relying on emergency [drought resilience] measures would cost an estimated £40 billion over the next 30 years – being resilient would cost only £21 billion"¹. However, many other tensions between objectives also exist.
- **A clearer, longer-term policy direction, which could include:**
 - **Clearer investment priorities and resilience standards** to help facilitate investment in areas where there is a need but difficult trade-offs. This could mean, for example, the NIC developing a list of national water infrastructure priorities
 - **National policy for affordability** so social tariffs can be used in the most effective way
 - Ensuring the sector can draw on **alternative funding sources** (e.g., the Environmental Land Management Scheme for environmental improvements to protect affordability)
- **Joined-up policy** across different sectors that has a more complete understanding of interdependencies, and systems (e.g., the relationship between water efficiency and building standards)



6

Next steps

Have your say

We welcome your responses to this Discussion Paper by close of business on 31 March 2021.

Respondents are encouraged to provide details of evidence which support your conclusions to enable us to understand the basis on which those conclusions have been reached.

We would appreciate if you could refer to the relevant question numbers in submissions. Please send your responses to:

Vision2050@water.org.uk

The deadline for submissions is 31 March 2021

Challenges

1. What is your view of the biggest challenges, trends, risks and opportunities running up to 2050?

Vision

2. If you were looking back from 2050, what are the biggest differences you would like to see for customers and the environment?

Sector strategic responses

3.
 - a. How do you expect the sector to respond to the challenges?
 - b. How should the role and focus of the water company change?
 - c. What are the advantages and disadvantages of that change?

Building a shared endeavour to achieve progress

4.
 - a. How should companies, regulators, policy makers, customers and other stakeholders work together to achieve the Vision?
 - b. What areas are priorities for additional thinking, analysis, data or other work?
5.
 - a. What responsibilities do other stakeholders have to support improvement?
 - b. What changes do you wish them to make?

Next steps

This Discussion Paper is a first step towards a 2050 Vision that we and our stakeholders can all stand behind. We are seeking views on our assumptions and early thinking.

Success demands a more outward-looking sector, increasingly solving problems with partners, and we therefore invite all stakeholders to engage with us at this early stage.

We will be working with government, regulators and other groups to get their views on this Discussion Paper, and we are keen to hear from a wide group of stakeholders through our consultation (see previous page for questions).

We will reflect on the feedback received through this phase of consultation with a view to publishing a 2050 Vision document this summer. This Vision will not be fixed and we will continue to develop it openly as we move into the implementation phase, monitor our progress, and ensure that the Vision continues to evolve over time as more information comes to light. And soon enough we will need to work together again to develop a 2060 Vision to ensure that we are continually planning for the future together.



4 March 2021

Discussion paper published



March 2021

Focused engagement with stakeholders



31 March 2021

Deadline for responses to consultation questions



April-June

Development of Vision roadmap



Summer 2021

Publication of Vision 2050



Evolution and joint delivery of the Vision



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