‘Water 2020’

Long term challenges and uncertainties for the water sector of the future

This paper has been written by Anglian Water, United Utilities and Yorkshire Water as a contribution to Water 2020, Ofwat’s programme for determining the form of the 2019 review of water price controls.

YorkshireWater

United Utilities

love every drop anglianwater

LONG TERM CHALLENGES & UNCERTAINTIES FACING THE SECTOR

CURRENT EVIDENCE BASE

- Company business plans / SDS plans
- Water 4 Life
- Pitt & Cave Reviews
- Water industry thought leadership papers
- Valuing natural capital papers
- WEF Annual Risk Report 2015
- A4S Managing Future Uncertainty / Natural Capital papers
- Tideway case study
- PR14 Customer research
- Investor surveys
- **PLUS SPECIFIC RESEARCH (PER ISSUE AND COMPANY)**

LONG TERM UNCERTAINTIES

Population and household growth

Technological change

Rising energy costs

Resource costs and availability

Changing customer profile and expectations

People and skills

Climate change

Ageing assets

Environmental legislation

Affordability

Investor confidence and availability of finance

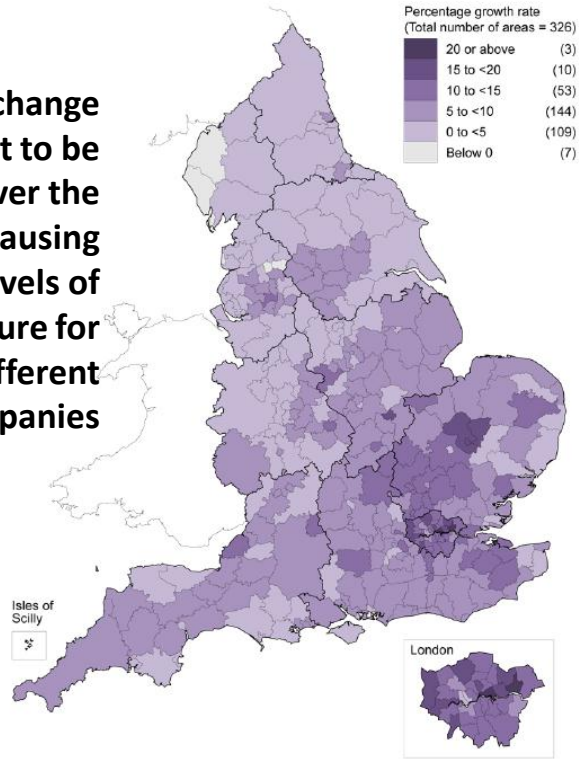
- **Collate and understand the evidence base.**
- **Understand interrelatedness of issues and impacts, and their prioritisation.**
- **What is the scale of and uncertainty associated with the challenge?**
- **What are the implications? What are the risks and opportunities?**
- **What questions does this present?**

POPULATION AND HOUSEHOLD GROWTH

What's the evidence base?

- UK population to increase to 73.3m by 2037 (2013, pop. of 64.1m).
- Faster than average growth forecast in water stressed areas: London 13%, SE 7.8%, East (8.6%) over next 10 years.
- Number of households in England projected to increase from 22.3 million (2012) to 27.5 million (2037).

Population change is forecast to be uneven over the country causing different levels of pressure for different companies



What are the potential implications?

- Increased demand for water and sewerage services, and the cost of investment to maintain services.
- Increased environmental pressures: biodiversity implications of greater abstraction, carbon impact from energy / chemical use.
- Increased surface run off from household building and urbanisation, increasing risk of overloaded sewers.
- More customers to spread cost of services over – eases affordability challenges.
- Water efficiency opportunities.
- Investors see potential for RCV growth.

What are the key questions?

- How does population growth impact the average bill?
- How to inform and engage customers about long term pressures, desired levels of service and the resultant water bill?
- How to encourage more sustainable behaviours?
- What is the role of metering in encouraging efficiency and delivering the fairest way to pay?
- What will be the detailed approach to abstraction reform?
- Do we need a fundamentally different approach to water resources within and between regions?
- How do we plan correctly so that water resources and infrastructure are not a restriction on growth?
- Should we influence national and regional government to guide population growth away from water stressed areas?

CLIMATE CHANGE

What's the evidence base?

- The world's climate has changed. Increasing evidence links emissions and specific extreme weather events.
- All UKCP09 scenarios suggest summer rainfall will decrease and winter rainfall increase at the 50th percentile.
- Defra, Ofwat and water company risk assessments identify priority risks to water supply and flood resilience

Climate change is likely to result in more regular infrastructure failure caused by extreme rainfall, predicted to increase in frequency.

What are the potential implications?

- Increased investment needed to maintain resilient service, resulting in affordability pressures.
- We need to change customer, supplier and employee behaviours to drive emissions reduction and innovation.
- Water companies have substantial scope to generate cost-effective renewable energy (saving customers money, but requiring upfront capital investment).
- A driver for innovation and financial, carbon and resource efficiency.
- Basing extreme weather risk analysis on past experience may not be sufficient.

What are the key questions?

- How do we plan for an uncertain future climate?
- How do we inform and engage customers about long term pressures, desired levels of service and the resultant water bill?
- What is the role of metering in encouraging water efficiency and delivering the fairest way to pay?
- What is the right balance in protecting the water environment and the atmospheric environments?
- Do water companies have a role in reducing their own carbon emissions?

ENVIRONMENTAL LEGISLATION & ABSTRACTION

What's the evidence base?

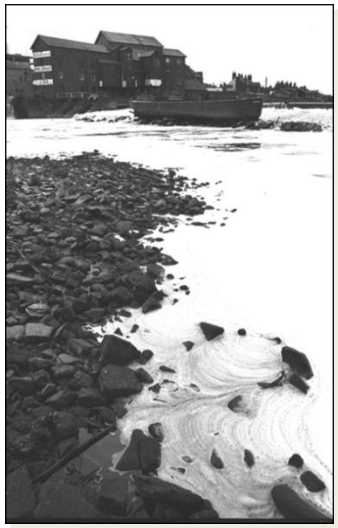
- C£50bn investment since privatisation on quality and service improvements. River & bathing quality improved
- But through point solutions, little focus on diffuse pollution
- "Easy stuff" done (at a cost), BUT legislative obligations remain: Water Framework Directive, Urban Wastewater Treatment Directive, Habitats Directive, Bathing Water Directive, Shellfish Directive…
- Water security threatens Public Water Supply, Agriculture, Energy, other abstractors AND the environment.
- Customer & stakeholder expectations are increasing pressure to improve the natural environment
- New emerging threats: micro-pollutants, chemicals, endocrine disruptors… AND zero tolerance for failure: new sentencing guidelines resulting in significant fines.

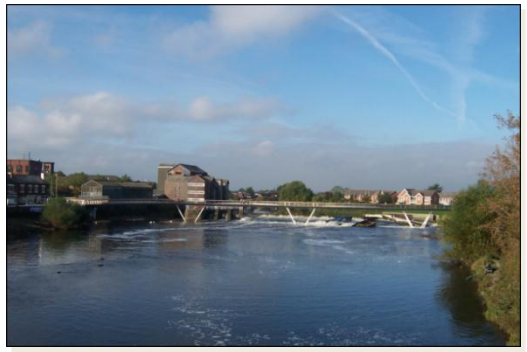
What are the key questions?

- How can we collaborate: multi-sector resource plans, catchment management, ecosystem services? What's the role of markets/regulation (Ofwat/EA)? How should multi-sector assets be financed?
- How do we take account of sentencing guidelines in decisions to invest: are standards and prosecution policies appropriate?
- Can we cut red tape and shape EU legislation?
- How do we work with customers to change behaviours and acceptability of water recycling?
- What's the Impact on bills and affordability?

What are the potential implications?

- Need to work collaboratively with others:
  - Catchment management and ecosystem services: end of pipe solutions not sustainable
  - Multi-sector water resource strategic planning and abstraction reform and trading
- Long term sewerage planning to meet customer expectations and needs of the environment.
- New sentencing guidelines will shift Cost Benefit equation: significant fines even where no actual environmental damage and low/no culpability. Has the potential to distort investment away from real improvements.
- Need to move towards circular economy: UK interpretation of EU guidance can be restrictive – definition of waste
- Need changes in customer behaviour – acceptability of recycled water, misuse of sewers etc.



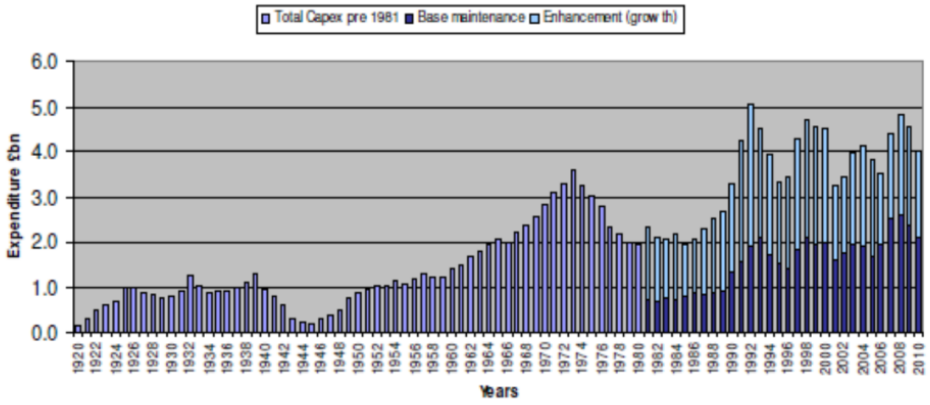


River Aire at Castleford in the 1970s (left) and now (above), showing improvement in river water quality and amenities

AGEING ASSETS

What's the evidence base?

- Expectation at privatisation: significant enhancement investment for ten years, followed by a shift to improving services and maintaining assets.
- Increase in maintenance in 2005 following introduction of Common Framework - investment based on forward looking risk assessment. Increase reflected enhancement investment in previous 15 years, with shorter asset lives. Little shift in implicit asset lives of infrastructure assets.
- At PR14, cost assessment modelled on AMP5 levels of maintenance and operating costs. Across industry AMP6 "totex" = AMP5 "totex". Implies significant efficiencies after allowing for increased asset base.
- Companies have been successful in maintaining services and improving asset serviceability – better information, innovation and targeted maintenance. Asset lives increasing e.g. Anglian Water sewers rate of replacement indicates c.900 yr asset life.
- Customers expect companies to look after assets for future generations – asset stewardship.



Source: Water UK – Water Facts 1995 and Ofwat – Future water and sewerage charges 2009-10. Final Determinations

What are the potential implications?

- The current approach has been successful in maintaining services and asset serviceability – through information, risk management and focussed investment.
- Innovation has resulted in efficiencies that have maintained services e.g. no-dig, relining techniques for mains, new treatment processes for non-infra.
- Further innovation and risk management may not be sufficient in the future. A step increase will be required at some point.

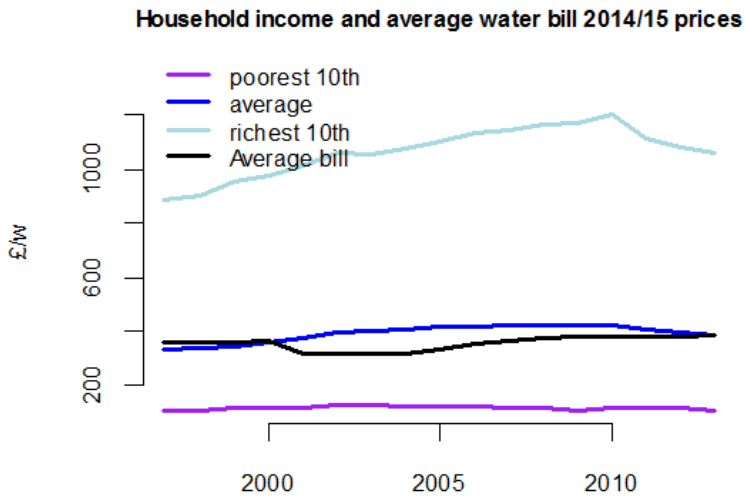
What are the key questions?

- Will innovation keep up with asset lives continuing to get longer?
- How should regulatory methodologies deal with forward looking, risk based approaches?
- Can we improve predictions of failure so we act before failures occur and service deteriorates?
- Would upstream competition and price control disaggregation require new ways of working to ensure we make effective interventions at the right point in the value chain?

AFFORDABILITY

What's the evidence base?

- Water bills have risen since privatisation, due to necessary on-going investment.
- Income is unevenly distributed over the country. Welfare reforms will hit more deprived local authorities hardest.
- Water debt is seen a low priority, meaning customers with multiple debts are unlikely to pay their water debts.
- Suggested acceptable levels of social tariffs are significantly smaller than existing de facto bad debt subsidies.



Income inequality has risen since privatisation, showing the affordability constraints felt by some customers

Data: https://www.gov.uk/government/statistics/households-below-average-income-hbai-199495-to-201213

What are the potential implications?

- Water poverty will continue to be an issue for the poorest and most vulnerable in society, and will continue to attract political pressure.
- Bad debt caused by non-payment will continue to be a major retail risk, and a de-facto cross subsidy.
- The regional nature of water companies means social cross subsidies are likely to be contained within the same region, compounding the problem for companies with the largest problems with affordability.

What are the key questions?

- How do we mitigate against the risk posed by bad debt to our retail businesses?
- How do we implement acceptable, effective social tariffs?
- Are innovative national solutions possible? Eg, £50 bill reduction for South West Water.
- How we do balance future need for continuing investment against affordability for our poorest customers?
- How do we ensure water customers pay an appropriate proportion of environmental costs?

CHANGING CUSTOMER PROFILE AND EXPECTATIONS

What's the evidence base?

- There was a misalignment between company's customer research at PR14 and Ofwat's planned regulatory mechanisms.
- Mobile and digital technology has transformed customer expectations over the past few years.
- Demographic predictions suggest future population will be older and live in smaller households.
- There is an increasing awareness of environmental issues among customers.

DISCOVER DISCUSS DECIDE

Putting customers at the centre of water sector planning will be vital to our future success

What are the potential implications?

- Customer expectations will continue to change: disruptive technologies will drive new behaviours.
- We will have more elderly and potentially vulnerable customers.
- Customer engagement post PR14 will have to change to meet the requirements of future price reviews.

What are the key questions?

- How to keep regulatory mechanisms up to date with technology, e.g. should tweets be incorporated into SIM? How should they be weighted?
- What will future expectations of customers be? E.g. customers currently see leakage as a major priority, esp. when asked to save water themselves. Will environmental issues be a high priority in the future?
- How do we design customer engagement that meets the requirements of future regulation?
- How do we meet the (sometimes conflicting) requirements of both customers and legislation / regulators?
- How do we ensure future services meet the needs of the changing population?

TECHNOLOGICAL CHANGE

What's the evidence base?

- Technology is constantly changing. Societal and customer expectations regarding technology are increasing.
- The water industry has successfully introduced new technology to improve service and reduce cost.
- Existing technology does not allow us to meet future challenges posed by changing legislation and resource and energy pressures.

What are the potential implications?

- The speed at which the water industry embraces new technology will have to accelerate to meet challenges presented by the changing world. We will have to overcome barriers posed by long term assets.
- We need to find new technology to meet existing legislation. Eg, to reduce phosphorous levels in final effluent.

'Ice Pigging' is an example of new technology, designed for another industry (food), being successfully used to clean water mains (pig photo: Hamilton Ice Sculptors pinterest)

What are the key questions?

- Can we use technologies from other industries to meet our challenges?
- How do we collaborate with other utilities and existing research initiatives?
- How can industry create the environment to bring forward innovation?
- How do we share knowledge in an increasingly competitive environment? How can regulation facilitate this?
- Are existing collaborative methods and groups effective in the future world?
- How do we keep pace with technological change, particularly with customer expectations?
- Will technological change need funding beyond levels seen in recent history? If so, how do we fund this increase?

PEOPLE AND SKILLS

What's the evidence base?

- Companies have dealt with people and skills issues in a variety of ways. Some have reduced the workforce, some have increased use of contractors, and some have brought more work in house. All have been looking for more efficient operations.
- Looking ahead, an ageing workforce, and growing competition for scarce technical skills will drive up costs. Eg, AWS: more than 70% of workforce born before 1980; 6% are over 60; YWS: 16% over 55, 5% over 60.
- Rising customer expectations and more innovative treatment processes will increase skill levels we require of our people.
- Workforce is predominantly white and male: AWS, 96% white and 70% male; YWS 83% white, 77% male.

Many companies have begun recruiting apprentices or expanded their apprentice programmes to ensure the continuity of skills for the future

What are the potential implications?

- We need to recruit and train new employees to meet our future needs.
- We may need to re-train our existing employees to ensure they have the skills required in the future.
- We should encourage a more diverse population to study STEM subjects, which may help address the skills shortage
- Other challenges such as energy and resource costs mean the skills in our future workforce may not be the same as the skills in our existing workforce.

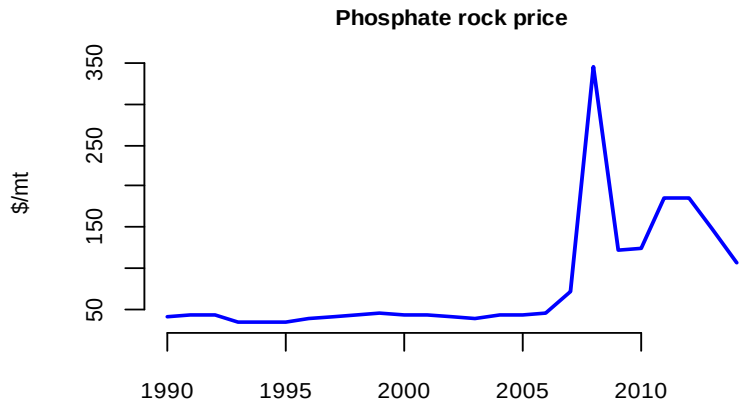
What are the key questions?

- How do we identify and grow the skills our workforce and supply chain will need in the future?
- Will addressing the diversity imbalance help reduce the skills shortage?
- How do we ensure the water industry is an attractive sector for young people to build careers?
- Will an influx of new employees and a change of the workforce demographic revitalise the industry leading to fresh ideas and new ways of working?
- How do we leverage the digital skills and understanding of our Generation Y employees to improve efficiency and modernise service?

RESOURCE COSTS AND AVAILABILITY

What's the evidence base?

- Since 2000 a growing number of commodities have seen constraints in supply and increasing price volatility (particularly oil, steel and rare earth metals).
- A growing global population, urbanisation and expansion of the middle class is rapidly increasing consumption rates of materials and resources.
- Risks to technology and mechanical solutions come through scarcity and exposure of tin, rare earth metals, copper and cobalt amongst others, whilst risks to chemicals supply also come (for example) from phosphates and fluorspar availability.



It is likely that fluctuation of phosphate prices will make recovery cost beneficial, at some point in the future

Data: http://www.mongabay.com/commodities/prices/phosphate_rock.php

What are the potential implications?

- There is an opportunity to create value by investing in more efficient processes.
- There is potential to expand into new markets, eg, recovery of minerals from sludge.
- Public awareness and scrutiny is adding to the importance of responsible consumption, particularly where extraction of primary materials have environmental and social costs that may otherwise be unaccounted for.

What are the key questions?

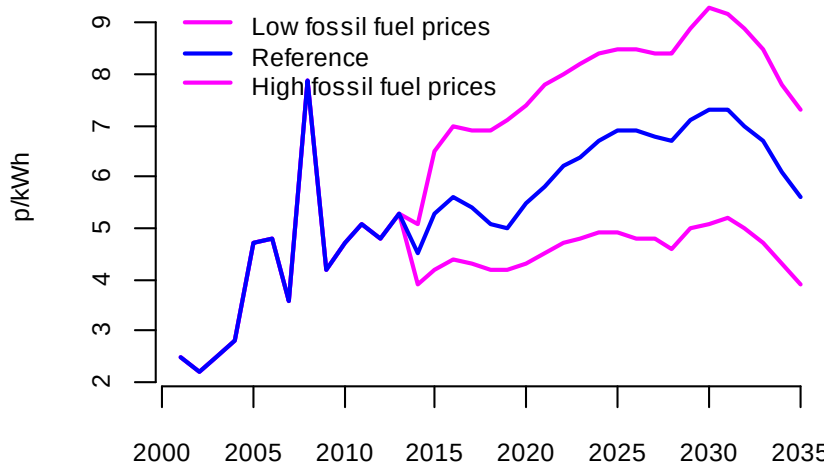
- How do we manage the uncertain future of resource costs and availability to determine an effective approach, and make a robust business case?
- Do we have the ability to trace, understand and verify sourcing of material through the supply chain?
- How do we secure customer, political and regulatory support for the necessary innovative responses and required investment?

RISING ENERGY COSTS

What's the evidence base?

- Global energy demand is set to grow by 37% by 2040.
- Geopolitical issues continue to cause uncertainty in oil and gas markets.
- The future of coal is limited by pollution and emissions control measures.
- Fossil fuel subsidies of $550 billion in 2013 are holding back investment in efficiency and renewables which received less than a quarter of this.

Wholesale electricity prices 2014 pricebase



Energy costs are forecast to almost certainly increase in the short term. The question is, by how much?

Data: https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2014

What are the potential implications?

- Energy costs and price volatility present an uncertain future, and growing risk to the water industry.
- We need to reduce reliance on traditional energy sources while affordably maintaining and enhancing services to a growing number of customers.
- There are opportunities to pursue renewable technologies opening up potential investment opportunities.
- Many water companies are significant landholders. What has previously been seen as undesirable land may now provide development opportunities for renewable technologies.

What are the key questions?

- How do we secure customer, political and regulatory support, and associated investment, for the necessary innovation to develop low energy intensive processes, and new energy generation schemes?
- How do we change the behaviours of customers, suppliers and employees to drive the required reduction in energy consumption?

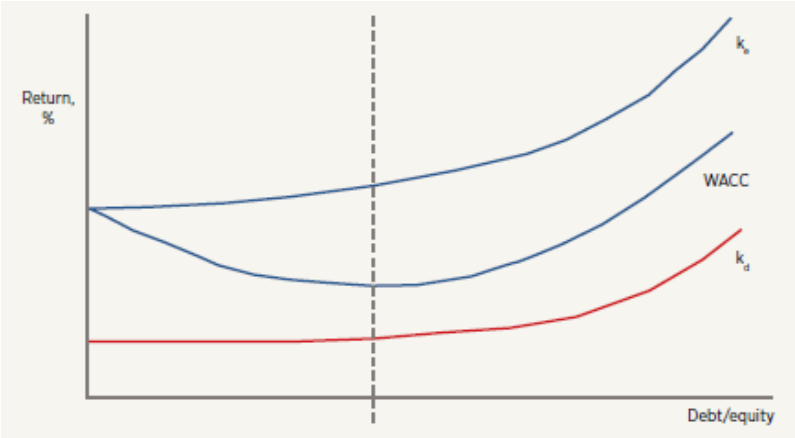
INVESTOR CONFIDENCE AND AVAILABILITY OF FINANCE

What's the evidence base?

- Predictable and transparent regulation is key to maintaining credit ratings, and attract investment (Water UK investor survey, Moody's)
- Currently, there is significant availability of low cost finance.
- The Western economy is still recovering from economic downturn.

What are the potential implications?

- Availability of low cost finance may change when the global economy recovers.
- Longer term increase in cost of debt (although delayed).
- Future increase in competition for finance may lead to opening of global finance markets to the water industry.



Establishing an appropriate WACC is a key part of ensuring financeability of the water sector

What are the key questions?

- What is the long term volatility in debt and capital markets?
- How transparent is the established method underpinning WACC?
- What could multi-agency financing models look like to allow necessary investment?
- How do we both implement reform, and maintain predictable and transparent regulation?
- Will alternative sources of finance be available in the future?
- Is there an appetite for non-regulated finance, not backed by RCV?
- Could the finance model be extended to other water related sectors?