



Building Resilience

Infrastructure Health in the Water Sector

Hosted by Karma Loveday, Founder
and Editor of The Water Report

Building Resilience – Infrastructure Health
in the Water Sector, 21 May 2024 at
Events @ No.6, 6 Alie Street, London E1 8QT

Affinity Water

NORTHUMBRIAN
WATER *living water*

love every drop
anglianwater 

Wessex Water
YTL GROUP 

On the day

09.30–09.40

Welcome – Peter Simpson, CEO, Anglian Water

09.40–10.00

Opening keynote – Margaret Read, Policy Director, National Infrastructure Commission

10.00–10.50

Wider perspectives

- Tom Harvie-Clark, Group Financial Controller, Scottish Water
 - Steve McMahon, Director of Price Controls, Ofgem
 - Matt Hateley, Director of Asset Management and Operational Resilience, Ofwat
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10.50–11.10

Break

11.10–11.50

Panel discussion and Q&A

- Margaret Read, Policy Director, National Infrastructure Commission
 - Matt Hateley, Director of Asset Management and Operational Resilience, Ofwat
 - Andrew Beaver, Director of Regulation and Assurance, Northumbrian Water
 - Steve McMahon, Director of Price Controls, Ofgem
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11.50–13.15

Asset health workshops

13.15–13.30

Closing Remarks – Matt Greenfield, Wessex Water

13.30–14.00

Lunch

Understanding infrastructure health in the water sector

Water and wastewater assets are critical to the safe and reliable provision of customer services and the protection of the environment. Ensuring that assets are healthy and operationally resilient is therefore critical. The existing regulatory model and behaviour of water companies indicate that current levels of asset maintenance and replacement are not sustainable in the long term. This risks the delivery of essential services to customers and the protection of the environment.

Despite some asset health metrics showing improvement over time, the [National Infrastructure Commission](#) noted that over the 2019 Price Review, Ofwat funded companies' plans based on proposals to renew water mains at a rate of 0.4% per year. If this rate was maintained, it would imply that these assets would need to last up to 180 years. [Water UK](#) has identified an average asset life of 60 years. This demonstrates the divergence between known asset life and replacement rates, which in the long term will lead to asset degradation.

Regulators too are considering these issues. [The Water Industry Commission for Scotland](#) identified asset replacement levels far below the long-term rate implied by asset life assumptions and increased the capital maintenance funding available to address this in their most recent price review of Scottish Water.

[Ofgem](#) in its RIIO network price controls introduced Network Asset Risk Metrics (NARMs) which it used to assess the consequence and probability of an asset failing and therefore the benefit to consumers of companies' asset management activities. [Ofwat's PR24 methodology](#) acknowledged these concerns too and, consistent with the [CMA](#), advocated for the consideration of forward-looking approaches but these have not yet been implemented for PR24. Ofwat has also sought to better understand the maturity of companies' asset management approaches through the [Asset Management Maturity Assessment \(AMMA\)](#) and its ongoing work on [Operational Resilience](#).

Delivering for the future: an industry response

In response to this challenge Affinity Water, Anglian Water, Northumbrian Water and Wessex Water have convened a new project on behalf of the water sector aiming to identify critical elements of a new framework for measuring, managing, and funding asset maintenance. This is a collaborative effort, with very welcome active participation from companies across the water sector and a Steering Group including Ofwat, Water UK and Defra. The aim is to identify how the regulatory framework can be adapted for the next price review in 2029 to best address the identified concerns.

21 May – how you can help

The event will provide an opportunity to review and feedback on the solutions identified by the project in Phase 1 and the potential next steps. It will provide an opportunity to hear from the project team and reflect on the interesting approaches adopted in other sectors and jurisdictions to similar challenges and to hear from senior sector experts on the topic.

The potential solutions or ‘packages’ of reform you will be asked to discuss are set out on pages 7-9.

Following the event there will be a short survey issued with a summary of Phase 1 giving all stakeholders an opportunity to provide written feedback.

We will need continued and growing engagement across the sector, particularly from companies as we take forward this work in the next phase. These new datasets will reveal new information which might be uncomfortable, and we will need to navigate to a new framework that is sensible for the sector collectively without trying to account for every local circumstance.

This will likely require new governance in the next phase and beyond, ideally with greater involvement from companies and regulators. Significant work is required, and we will need to begin now to ensure that a new framework can be implemented for the next price review in 2029, if this is supported by Ofwat.

Further information

The problem statement

In exploring the problem and related issues this first phase of work has identified four inter-related concerns with the regulatory framework as it stands:

- 1. An informational concern:** currently there is insufficient information available about the risks to service disruption and adverse environmental outcomes in the future that may arise from poor asset health and how these risks are being managed by companies.
- 2. A behavioural concern:** the framework may create a set of incentives for companies that are not well aligned to the best outcomes for customers and the environment over the long term. Instead, companies may be incentivised to make insufficient investments in the maintenance and replacement of their assets to manage future risks.
- 3. A funding concern:** the funding allowances given to companies from customer bills under the current regulatory approach are unlikely to be sufficient to properly remunerate efficient companies that adopt good behaviour in relation to asset health.
- 4. A responsibilities concern:** that, given how companies act (or are likely to act) under the existing framework, the regulator may not take enough responsibility for understanding and mitigating – through its own actions or decision making – long-term risks to customers and the environment that may arise from asset deterioration and poor asset health.

These concerns individually and collectively could create future risks for customers and the environment if unaddressed. Services may become less resilient to extreme weather in the context of climate change, and if failures do occur then they are likely to cost far more to address after the event than if risks are proactively managed. This point was explored by the NIC, for example in its report [‘Preparing for a drier future’](#).

Structure of the project

The initial phase of the project is built around two pieces of independent research:

- Reckon is leading a workstream to identify **potential problems with Ofwat's current regulatory framework** regarding the treatment of capital maintenance expenditure, asset health and risks to customer service and environmental outcomes in the future. It has explored potential reforms to the regulatory approach to tackle these problems, including changes to the approach to cost assessment and incentives.
- Jacobs is leading a workstream to identify and assess **a range of metrics that would help to reveal current and future asset health risks** and historical trends in asset health, including metrics that could support the potential changes to the regulatory approach identified in the Reckon workstream.

Reckon and Jacobs have considered these concerns alongside examining the approaches used in other regulated sectors and jurisdictions. Long-lists of potential remedies to each concern have been identified and considered with the best solutions brought together into potential complementary 'packages' of reforms. The approaches taken in other regulated sectors elsewhere have been considered in developing these packages by Reckon. Jacobs has also reviewed an exhaustive list of asset health metrics that could be adopted in those packages and the availability and robustness of those metrics.

Potential ‘packages’ of remedies

Five potential ‘packages’ have been developed that might best address the concerns highlighted (labelled ‘P1’ to ‘P5’ below). These packages can be considered on a spectrum with the earlier options representing more incremental change to the current framework and the latter options requiring more substantial changes to the approach to cost assessment and other aspects of the regulatory framework. We summarise these options below:

Package	Description
<p>P1: Base cost benchmarking with improved process for funding additional investment in asset health.</p>	<ul style="list-style-type: none"> • This option would be the most incremental to the current regulatory model. • Ofwat’s approach to cost assessment would maintain a very prominent role for ‘base-plus’ econometric benchmarking models utilising historical data, but companies would be able to seek additional funding allowances under a dedicated process for asset health investments. This would build on, and expand, the ‘cost adjustment claim’ process that is currently available to companies. • Where a company receives additional funding under this process, this would be subject to ‘Price Control Deliverables’ (PCDs) or similar mechanisms to ensure that the company delivers on the expected outputs from that investment and funding. • Compared to the current arrangements, there would be greater reporting by companies against common metrics relating to asset reliability and operational resilience.
<p>P2: Base cost benchmarking with forward-looking and dynamic industry-wide adjustments and enhanced incentives on long-term performance.</p>	<ul style="list-style-type: none"> • Ofwat would retain a prominent role for ‘base-plus’ econometric models but a new explicit stage in the cost assessment process would be developed so as to apply an industry-wide adjustment to the results from these models to take account of evidence that the efficient levels of costs in the next price control period could differ from the costs observed historically. • This forward-looking modelling could draw on a range of evidence such as the outturn expenditure of companies versus the allowances given historically, trends in asset health and operational resilience measures over time versus expenditure levels, specific modelling of capital maintenance costs and more granular analysis of asset deterioration modelling and/or independent analysis of capital maintenance expenditure requirements (for example as has been undertaken by WICS in relation to Scottish Water) around the appropriate investment/replacement rates of assets. This and other information could be used to enable Ofwat to provide an industry-wide adjustment to allowances.

Package	Description
<p>P2: Base cost benchmarking with forward-looking and dynamic industry-wide adjustments and enhanced incentives on long-term performance.</p>	<ul style="list-style-type: none"> • In addition, a new sector-wide adjustment mechanism would be implemented at the end of the period, to adjust for the average difference, across companies, between outturn expenditure and the allowances set at the price review – enabling allowances to better track the evolution of industry spend and ensuring no under-spends or over-spends on average across the industry (this mechanism does not feature in any of the other four packages). • As for package 1, greater reporting by companies of data relating to asset reliability and operational resilience. • A series of measures adopted to better align the financial and reputational incentives that companies face with their long-term performance (e.g. to improve the prominence and credibility of information relating to companies' outcomes performance in the future and how this links to the health of their assets and capital maintenance activities; measures to reduce the risk that short-term cost control is as viewed as efficient behaviour).
<p>P3: Ofwat-owned assessment of capital maintenance with enhanced incentives for long-term performance</p>	<ul style="list-style-type: none"> • Under this option Ofwat's approach to cost assessment would move away from benchmarking of base-plus costs. • Instead Ofwat would move to a separate modelling approach/assessment of capital maintenance and operating expenditure for each company. This could be based upon econometric benchmarking of capital maintenance expenditure, a capital maintenance assessment based on estimated asset-lives (e.g. drawing on the WICS method), or some wider assessment of these alongside other approaches. • Under this option there would be no PCD-like mechanisms to support delivery or a sector-wide adjustment. • As for package 1, greater reporting by companies of data relating to asset reliability and operational resilience. • As for package 2, a series of measures adopted to better align the financial and reputational incentives that companies face with long-term performance.

Package	Description
<p>P4: Funding and delivery accountability based on composite asset risk metrics</p>	<ul style="list-style-type: none"> • New composite asset risk metrics would be developed (drawing on the approach used by Ofgem for its regulation of energy network companies). These would provide a key source of information on overall asset risk, taking account of both the likelihood and impact of asset failure on customers and the environment. This might also be developed and used with historical data to understand the trends in asset risk over time and could become a driver in the cost assessment process. • Ofwat would use either of the approaches to cost assessment from packages 2 and 3, drawing in part on historical data and forecasts for the composite asset risk metrics. • The funding allowed at the price control review for each companies' capital maintenance expenditure (or investment in asset health) would be contingent on its delivery against the composite asset risk metrics, with potential for funding to be returned to customers if asset risk has deteriorated relative to expectations on which the funding was based.
<p>P5: Regulatory review of business plans for capital maintenance with granular PCDs</p>	<ul style="list-style-type: none"> • Under this option Ofwat's approach to cost assessment would move away from benchmarking of base-plus costs. • Instead, Ofwat's cost assessment for capital maintenance would start from a review of each company's business plan proposals. Companies would provide proposed volumes, scope, and timing of asset replacement activities and Ofwat would adjust these if they were not well-evidenced. Ofwat may examine historical expenditure versus allowances and there would be a role for granular unit cost benchmarking. Ofwat may also review companies' asset management practises and processes to inform its view. • Companies would be subject to a detailed set of PCDs covering the set of planned capital maintenance investment that Ofwat's price control allowances are intended to fund, with potential for funding to be returned to customers if these investments are not delivered by the end of the price control period. • As for package 1, greater reporting by companies of data relating to asset reliability and operational resilience.

Range of Asset Health metrics

The Jacobs workstream has reviewed a range of cross-sector approaches to compile a range of categories of potential Asset Health metrics and indices. Of the eight categories of metrics identified, five were considered higher priority for greater potential use:

1. Individual resistance and reliability metrics, which focus on the components of resilience which have the closest link to asset health. Existing examples include sewer collapses or mains bursts.
2. Asset life metrics and indices, which calculate or indicate remaining asset life in some way Existing examples include: cost per year of life (WICS), Base Asset Health, Asset health deficit
3. Risk indices, which calculate an asset risk level, score or value, often then summarised into risk categories. Existing examples include: asset risk / network risk (NARM), Compliance risk index.
4. Outcome-based metrics, which measure outcomes to customers and/or the environment. Existing examples include: interruptions to supply and internal sewer flooding
5. Qualitative, multi-dimensional indices, which assign qualitative scores to a set of discrete categories. Existing examples include: Overall Equipment Effectiveness and Current Health Index.

Lower priority

6. Activity metrics, which relate to a range of activity types
7. Redundancy metrics, which capture or relate to back-up or parallel capacity.
8. Response and recovery metrics, which relate to responses to incidents.

Evaluation

The project has evaluated these five alternative packages against the following criteria:

1. The extent to which the package is likely to address the concerns identified most effectively;
2. The potential risk of unintended consequences;
3. The scale of the implementation challenges; and
4. The potential ongoing regulatory burden.

Based on this evaluation the initial view from the project is that options P2, P3 and P4 are shortlisted for further consideration in the next phase of the work. These options appear to have the best chance of addressing the concerns identified but we want to explore this with stakeholders at the event.

Next steps

Significant further work will be needed to operationalise the packages being considered but some of the packages, including P2-4, overlap and have common features. So similar work will be needed to define and operationalise them. At the same time given the implementation challenges and interrelationships with other parts of the regulatory framework it may be sensible to retain multiple potential options at this stage.

On that basis, for the next stage of the project we consider that it would be helpful to:

1. **Improve the data on asset health and operational resilience** – Start to develop arrangements for reporting more granular and consistent metrics of asset health and operational resilience across the asset base building on the detailed analysis of available metrics and approaches identified by Jacobs. Jacobs have identified the following recommendations:
 - Define one or more reliability and resistance metrics for each asset category, and link these to outcome metrics where possible.
 - Design and test a risk metric for a selected asset category / categories
 - Consider different approaches to monetise end of life assessments and consider how risk could be included in the assessment.
 - Develop methodologies to produce forecasts of the metrics under defined future scenarios.

The UKWIR project may be exploring opportunities in this space.

2. Develop alternative analytical tools to support the cost assessment process

– Flesh out further the analytical tools and sources of evidence that could bring a more forward-looking perspective to cost assessment. This might include, inter alia, historical analysis of trends in investment and asset reliability or performance, forward looking analysis of expenditure to maintain/restore asset health (like the WICS approach), developing new econometric models for capital maintenance expenditure and/or exploring the inclusion of asset health drivers in the existing base-plus models and/or modelling potential asset deterioration under defined scenarios for expenditure in the future.

3. Develop the potential informational remedies that go beyond data reporting

– Flesh out further the set of initiatives identified under packages P2 and P3 which are intended to enhance the information available about the risks to customer and environmental outcomes in the future, relating to asset health, and how these risks are being managed. These are a key part of the initiatives under packages P2 and P3 to enhance companies' incentives for longer-term performance.

4. Planning and adaptive pathways to regulatory reform

– Start to map out some adaptive pathways to the development and application of regulatory reforms including highlighting how and when choices could be made about the pursuit of different options.

Other significant reports on Asset Health

The initial phase of the project is built around two pieces of independent research:

- The 2019 [Bush and Earwaker](#) report, which set out concerns about Ofwat's historical approach to cost assessment and recommended it be triangulated "with more grounded asset evidence".
- In 2022 [Economic Insight and Water UK](#) identified implausibly high asset lives implied by current asset replacement rates and set out recommendations for how to address this.
- Several companies have also made contributions to the debate through the ['Future ideas lab'](#).