Moving forward together: A new era beckons the UK Water Sector

As the UK's water industry strides into the largest investment period in its history, it stands on the brink of a transformational shift.

by Sally Walters
co-vice president of engineering, Institute of Water, and national discipline lead for civil and structural engineering, Stantec

Right now, there has never been more scrutiny, more expectation for delivery, and more urgency, laid at the feet of those working in water. And at the same time, we're seeing a hyper-evolution of technology and innovation take place on a global scale. Bringing these two seismic prospects together is now a priority for the sector. But in the next water planning cycles, we also need the public, authorities, regulators, and the wider industry to collaborate and work through these issues– if we're going to change the current tides of perception. The industry needs to rebuild trust – and trust is born from transparency.

Delivering for communities

By making the successful delivery of innovative initiatives more visible, we can increase transparency. We, in the sector, know our positive impact is accelerating. We're getting faster at responding to problems in networks. We're becoming more efficient in the way we design and deliver schemes. We're harnessing the power of new technology and nature, simultaneously. For those in the know, our influence is being increasingly felt in communities nationwide and will be for generations. Even if the communities themselves aren't yet aware of those responsible for change. This can be a great source of pride for everyone involved.

Innovation, backed by increasing levels of understanding, application, and investment, is undoubtedly the catalyst for this acceleration, specifically in the digital space. Stantec, a trusted partner for water companies across the UK and Ireland, is working to transform the industry's future, redefining what's possible for every region, and every community throughout the next ten years. Becoming a digital leader is central to these ambitions.

An accelerating wave

We've long been championing digitalisation across the sector and around the world. Our Hydraulic Analysis and Design System (Hades) is a continually evolving software tool that has been helping engineers design and analyse the hydraulic response of water through structures and control points for more than two decades, for instance.

We know that the biggest challenges our clients face in water: demand and scarcity, aging infrastructure, climate change impacts, pollution, operational efficiency and the delivery imperative, can all be addressed more efficiently and effectively through the greater adoption of AI-enhanced digital tools and machine learning.

Take, for example, the approach to fluvial flood mitigation. Engineers traditionally spend a lot of time and resources creating detailed and tailored flood models, but if we can automate this – training AI agents from tens of thousands of hours of manual data sets, then we can make the entire system more efficient, and more effective going forward. It's now possible to use machine learning to map flood risks instantly, for any area, before and during an event. The resulting information can then be used to design infrastructure to mitigate future impacts of flooding in a given location.

Best practice needs to be shared

The digital and AI wave has reached us at the perfect time for the sector. It presents huge opportunities for becoming smarter, more efficient, and more cost-effective, and for how we create solutions for problems big and small. It's exciting to see water companies quickly evolve their approaches in its wake.

In Bradford, our client, Yorkshire Water, is transforming wastewater network monitoring with advanced data analytics, AI, and the IoT tech deployed through its pioneering Intelligent Risk and Insight System (IRIS). Building on the success of the Ilkley Smart Wastewater Networks trial, IRIS aims to reduce sewer flooding and overflow discharges while improving operational efficiency and customer value.

IRIS integrates real-time sensor data, machine learning, and a complete digital twin of the wastewater network to enable proactive, data-led decision-making. The system includes alarm optimisation, data quality enhancement, and intuitive visualisation tools, providing a comprehensive view of network performance. This is likely to drastically reduce the number of pollution incidents in this area, protecting and enhancing the local environment.

Expanding our reach

It's these types of outcomes – the ones benefitting communities from beneath the surface, hidden from view –we need to shine a light on throughout this new era. Accountability benefits everyone when we're delivering results that are critical to economic growth, public health and environmental resilience. Industry conferences and tradeshows are of course fantastic opportunities to be transparent about progress and project updates, but we need to look outside our sector, and our established audiences of peers.

Improvements in water and wastewater infrastructure can regenerate and protect existing communities, and they are also integral to the development of new ones. Co-creation, catchment thinking, and integrated partnerships will prove essential in the years ahead, as population and environmental challenges impact every sector. So, our messages and our transparency should reach and resonate with local authorities, developers, governments, community groups, and other local stakeholders.

Nurturing a purpose-driven, tech-savvy workforce

Rebuilding trust and pride in and around the water sector isn't particularly optional at this point. It's no secret that the industry has an urgent and growing need for diverse, skilled professionals. As senior figures leave the industry, it needs replenishing with a new generation of talent. And this needs to happen within the next five years, if not sooner.

The generation solving tomorrow's water challenges are more driven than ever by a sense of purpose. They're looking for careers that will be resilient, meaningful, and fulfilling, while giving them fundamental industry knowledge that will help set them apart. And importantly they're also more technologically adept at using and understanding AI than those retiring. This may prove essential, particularly when it comes to the design and delivery of new infrastructure. Set against an unprecedented scale of aspiration and scrutiny, the water industry is already making profound efficiency gains in this area using AI, machine learning, parametric design, and associated tech, so the need for cutting-edge digital skills is only accelerating. At Stantec, we're nurturing and refining these skills, helping optimise and automate design processes.

Automation is allowing for the rapid generation of models, containing all necessary data points and service layers, enabling quicker engineering design decisions and avoiding traditionally manual processes.

When it comes to storm overflows, smart monitors, or even nature-based solutions, we can also now use machine learning and rule-based decision-making to assess and identify optimal locations instantly. We're even developing new tools that allow us to input base parameters to instantly create technical 2D and 3D models for onsite infrastructure like stormwater assets. These productivity benefits, when scaled to the level required by the industry, will likely save thousands of hours in the design and delivery process over the next decade.

A rich industry with unlimited potential

As we deliver on our incredibly ambitious programmes of work over the coming decades, it's vital that the water sector is showcased to this generation for what it is. A rich, ever-evolving industry that protects the environment, future-proofs communities, and harnesses AI and innovation. And there's certainly no shortage of work.

This is a tremendously exciting moment for the industry. We should be passionate when speaking to our friends and colleagues in other sectors about the incredible work we're doing, the technology we're grasping, and the future we're shaping. We all have a responsibility to become more transparent. Yes, about our failures and our learnings, but about our many successes, improvements and our innovation too.