WATER INDUSTRY INSIGHTS

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NATURAL RESOURCES

Current and future challenges

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MAKING COMPLEX EASY

CURRENT AND FUTURE CHALLENGES

Using data to build a resilient and adaptable strategy to deliver future targets

2020 marks the start of a journey to deliver ambitious targets agreed between the UK water companies and their regulators.

Company business plans have outlined investments to deliver over 800 megalitres per day (Ml/d) of new capacity and demand reductions by 2025 through short-term supply options, leakage reductions, and water efficiency programmes[1].

The new regulatory targets were always going to be a challenge, and no more so than with the flooding across the UK during February, the onset of the COVID-19 pandemic, and the drought we are expecting to experience this summer.

Yet despite these conditions, early indications are that the regulatory targets will remain fixed with no exemptions proposed. Data collected during these extreme events provide valuable insight into water management and serve to underline the importance of high-quality data, interpretation, planning, and an ability to rapidly respond to change.

2020 insights

2020 has been quite a year already. It started with the significant flooding which stressed our catchments and networks. Then came the COVID-19 pandemic affecting all our lives. However, it's also provided companies with greater insight into what happens when certain network operations significantly reduce or stop altogether.

In the absence of some routine maintenance activities, water network performance has improved in some localities, for example with reductions to leak outbreak. For other areas the opposite is true, with significant leakage issues arising from reduced consumption and associated pressure build-up in distribution pipes.

Ongoing variability in customer consumption patterns has led to increased investment in real-time monitoring in recent years on the network, such as fast-logging coupled with enhanced data analytics. The impacts of factors such as weather and school holidays are increasingly understood. During the peak of the COVID-19 crisis, those water companies that logged just a small proportion of their non-household customers now have a significantly better understanding of the impacts caused by a change in demand. When the UK went into 'lockdown' people no longer showered at the gym, and office water use shifted to the home, the 100s of cups of tea made every hour in an office were spread over 100s of homes. Without a commute to deal with people were also getting up at different times, which spread the morning peak demand to be more like a weekend profile. Accurate measurement of consumption with more real-time monitoring is essential to ensure resilient supplies and accurate leakage estimation and prevent false alarms and ineffective targeting.

From a wastewater point of view, the closure of restaurants will have resulted in a decreased amount of fats, oils and grease (FOGs) being added to the network - reducing the potential for blockages. However, the lack of rain over much of the country is likely to increase the pressure on sewerage systems which needs the rainfall to help clear blockages - and this could result in increased flooding and pollution.

The take-away message is that with the new insights gained from these new data sets, it is possible to plan new ways of operating and maintaining our networks which can be tailored to specific locations based on how they respond to changing operational activity.

Striking a balance

How can companies ensure that their many targets and outcomes are delivered concurrently and in harmony, rather than acting as competing factors? Reductions in leakage have historically resulted in an increase in Per Capita Consumption (PCC) and interruptions to supply, yet all these need to reduce to meet targets. Issues for delivering inter-related targets such as these can arise from a combination of the analytical and operational approaches, and especially where a fully integrated strategy is lacking. Meeting leakage targets while also reducing interruptions to supply is a good example of where recent data from reduced network activity can be applied to inform the optimum balance of activity by locality.

Leakage, consumption and supply interruptions are clearly inter-related. In addition to impacting on each other, they can also influence water quality and wastewater asset performance by affecting the volumes of water entering our drainage and sewer systems. If working practices are to change in the long term due to COVID-19, then network and distribution designs will also have to be modified to reflect this change in water use. This will be amplified by the proposed reductions in PCC and leakage, meaning that peak and overall flows could be very different in 5 years' time to what we see today. Other opposing considerations relate to meeting future demands while ensuring enough water remains in the environment. Meeting the future challenges for cleanwater will have a knock-on effect on environmental and wastewater services. It's important that all potentially opposing factors are considered and we must employ a joined-up approach to harmonise delivery efficiently meeting customer and regulatory expectations on all fronts.

Reporting and accountability

Over the last two years there has been a strong regulatory focus on updating reporting guidance and improving the consistency of calculations between UK water companies. With respect to England and Wales, this results in some significant reporting changes heading into AMP7, with calculations such as leakage being rebased. This has also provided an impetus to incorporate new data systems, processes and analytical approaches leading into the new regulatory period. RPS is currently engaged with a number of clients to improve the accounting for Trunk Mains and Service Reservoir (TMSR) leakage and 'Passive Area' leakage upstream of District Metered Areas, ahead of wider long-term reforms associated with Flow Monitoring Zone set-up guidelines currently in development with the United Kingdom Water Industry Research Council.

With each improvement to the way key performance metrics are calculated and reported, the ability to visualise and target network monitoring and interventions improves. Ambitious regulatory targets and expectations have coincided with significant improvements to reporting and accountability with the UK water industry on a more level footing than in previous regulatory periods. This also encourages greater competition and has led to a variety of 'frontier' performance commitments and aspirations.

Frontier optimisation

In addition to the ongoing rollout of proven new technologies and associated improvements in data quality, companies are embracing new and innovative ways of combining this with 'old data'. With respect to leakage, strategies are being developed to incorporate dynamic feedback loops in a manner that increases the efficiency of leakage detection resources. Frontier Leakage Optimisation (FLO) is a good example of this in action, as discussed in our December article.

2020 has so far been a challenging yet insightful year highlighting the potential for new ways of working to achieve regulatory targets. This will ultimately be supported by the application of more sophisticated technologies and systems to allow faster decision making. Operating in the same vein as FLO, other examples of tools recently developed by RPS include those that improve water efficiency and consumption, for example, Frontier Consumption Optimisation (FCO) which demonstrates how consumption can be effectively managed using similar strategies to those we have employed for leakage. We have applied lessons from cleanwater applications and adapted these to wastewater applications, including for sewer maintenance, blockage reduction, and drainage water management plan investment. The same optimisation processes are applied to determine the right mix of options for the right location at the right time, whilst achieving a company's frontier performance commitments. When considered as part of an integrated delivery and targeting system, such as within WaterNet Pro™, the holistic benefits can be fully realised with competing targets efficiently.

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[1] Ofwat, 2019